actron®

CP9580

Auto Scanner® Plus

P/N 0002-000-3119

Scan Tool Information

Complete the following list using the function "**Tool Information**". Provide this information when contacting customer support.

Serial No: _____

SW ID: _____

HW Ver: _____

Boot Ver: _____

Prod ID: _____

Board ID: _____

Burn Date: _____

Burn Loc: _____

If you have questions or concerns Contact **Technical Support**:

•**Phone:** 1-800-228-7667
•**Website:** www.actron.com
•**Mail:** SPX Service Solutions
•655 Eisenhower Dr.
•Owatonna, MN 55060
•Attn: Technical Support

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Safety Precautions

For your safety, read this manual thoroughly before operating your Scan Tool. Always refer to and follow safety messages and test procedures provided by the manufacturer of the vehicle or equipment being tested.

The safety messages presented below and throughout this user's manual are reminders to the operator to exercise extreme care when using this test instrument.

Read All Instructions

Read, understand and follow all safety messages and instructions in this manual and on the test equipment. Safety messages in this section of the manual contain a signal word with a three-part message and, in some instances, an icon.

Safety Messages

Safety messages are provided to help prevent personal injury and equipment damage. All safety messages are introduced by a signal word. The signal word indicates the level of the hazard in a situation. The types of safety messages are.

⚠DANGER	**Indicates a possible hazardous situation which, if not avoided, will result in death or serious injury to operator or bystanders.**
⚠WARNING	**Indicates a possible hazardous situation which, if not avoided, could result in death or serious injury to operator or bystanders.**
⚠CAUTION	**Indicates a possible hazardous situation which, if not avoided, may result in moderate or minor injury to operator or bystanders.**
IMPORTANT	**Indicates a condition which, if not avoided, may result in damage to test equipment or vehicle.**

Type Styles Used:

Safety messages contain three different type styles.

- Normal type states the hazard.
- **Bold** type states how to avoid the hazard.
- *Italic* type states the possible consequences of not avoiding the hazard.

Icons used:

An icon, when present, gives a graphical description of a potential hazard.

Example:

Engine systems can malfunction expelling fuel, oil vapors, hot steam, hot toxic exhaust gases, acid, refrigerant and other debris.

Safety goggles and protective gloves must be worn by the operator and any bystanders. Even if everyday eyeglasses have impact resistant lenses, they are NOT safety glasses.

Engine systems that malfunction can cause injury.

Important Safety Messages

Risk of electric shock.

- **Do not exceed voltage limits between inputs indicated in the Specifications.**
- **Use extreme caution when working with circuits that have voltage greater than 60 volts DC or 24 volts AC.**

Electric shock can cause injury.

Risk of explosion.

- **Safety goggles and protective clothing must be worn by the operator and any bystanders.**
  - Even if everyday glasses have impact resistant lenses, they are NOT safety glasses, and may not provide adequate protection.
- **Do not use this scan tool in environments where explosive vapors may collect. These areas include:**
  - below-ground pits.
  - confined areas.
  - areas that are less than 18 inches above floor.
- **Use this Scan Tool in locations with mechanical ventilation providing at least 4 air changes per hour.**
- **Flammable fuel and vapors can ignite.**
- **Do not smoke, strike a match, or cause a spark in the vicinity of the battery. Battery gases can ignite.**

- **Avoid making an accidental connection between the battery terminals. Do not place uninsulated metal tools on the battery.**
- **When removing battery cables, remove the ground cable first.**
- **Avoid sparks when connecting or disconnecting power leads to the battery.**
- **Make sure ignition is off, headlights and other accessories are off and vehicle doors are closed before disconnecting the battery cables.**
  - This also helps prevent damage to on-board computer systems.
- **Always disconnect the battery ground connections before servicing electrical system components.**

Explosion can cause injury.

Risk of poisoning.

- **Use this Scan Tool in locations with mechanical ventilation providing at least 4 air changes per hour. Engine exhaust contains odorless gas which can be lethal.**
- **Route the exhaust outside while testing with the engine running.**

Poisoning can result in death or serious injury.

Battery acid is a highly corrosive sulfuric acid.

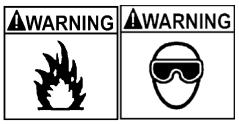
- **Safety goggles and protective gloves must be worn by the operator and any bystanders.**
  - Even if your everyday glasses have impact resistant lenses, they are NOT safety glasses, and may not provide adequate protection.

- **Make sure someone can hear you or is close enough to provide aid when working near a battery.**

- **Have plenty of fresh water and soap nearby.**
  - If battery acid contacts skin, clothing, or eyes, flush exposed area with soap and water for 10 minutes. Seek medical help.

- **Do not touch eyes while working near battery.**

Battery acid can burn eyes and skin.



Risk of fire.

- **Safety goggles and protective clothing must be worn by the operator and any bystanders.**
  - Even if your everyday glasses have impact resistant lenses, they are NOT safety glasses, and may not provide adequate protection.

- **Do not position your head directly in front of or over the throttle body.**

- **Do not pour gasoline down the throttle body when cranking or running the engine, when working with fuel delivery systems or any open fuel line.**
  - Engine backfire can occur when the air cleaner is out of position.

- **Do not use fuel injector cleaning solvents when performing diagnostic testing.**

- **Keep cigarettes, sparks, open flame and other sources of ignition away from vehicle.**

- **Keep a dry chemical (Class B) fire extinguisher rated for gasoline, chemical and electrical fires in work area.**

Fire can cause death or serious injury.

Risk of flying particles.

- **Safety goggles and protective gloves must be worn by the operator and any bystanders while using electrical equipment.**
  - Electrical equipment or rotating engine parts can cause flying particles.
  - Even if your everyday glasses have impact resistant lenses, they are NOT safety glasses, and may not provide adequate protection.

Flying particles can cause eye injury.

Risk of burns.

- **Batteries can produce a short-circuit current high enough to weld jewelry to metal.**
  - Remove jewelry such as rings, bracelets and watches before working near batteries.

Short circuits can cause injury.

Risk of burns.

- **Do not remove radiator cap unless engine is cold.**
  - Pressurized engine coolant may be hot.
- **Do not touch hot exhaust systems, manifolds, engines, radiators, sample probe.**
- **Wear insulated gloves when handling hot engine components.**
- **Tester leads can become hot after extended testing in close proximity to manifolds.**

Hot components can cause injury.

Risk of expelling fuel, oil vapors, hot steam, hot toxic exhaust gases, acid, refrigerant and other debris.

- **Safety goggles and protective clothing must be worn by the operator and any bystanders.**
  - Even if your everyday glasses have impact resistant lenses, they are NOT safety glasses, and may not provide adequate protection.
- **Engine systems can malfunction, expelling fuel, oil vapors, hot steam, hot toxic exhaust gases, acid, refrigerant and other debris.**

Fuel, oil vapors, hot steam, hot toxic exhaust gases, acid, refrigerant and other debris can cause serious injury.

Engine compartment contains electrical connections and hot or moving parts.

- **Keep yourself, test leads, clothing and other objects clear of electrical connections and hot or moving engine parts.**
- **Do not wear watches, rings, or loose fitting clothing when working in an engine compartment.**
- **Do not place tools or test equipment on fenders or other places in engine compartment.**
- **Barriers are recommended to help identify danger zones in test area.**
- **Prevent personnel from walking through test area.**

Contacting electrical connections and hot or moving parts can cause injury.

Risk of injury.

- **The Scan Tool should be operated by qualified personnel only.**
- **Use the scan tool only as described in the user's manual.**
- **Use only manufacturer's recommended attachments.**
- **Do not operate the Scan Tool with damaged cables.**
- **Do not operate the Scan Tool if it has been dropped or damaged, until examined by a qualified service representative.**

Operation of the Scan Tool by anyone other than qualified personnel may result in injury.

⚠WARNING

Risk of unexpected vehicle movement.

- **Block drive wheels before performing a test with engine running.**

- **Unless instructed otherwise:**
  - set parking brake
  - put gear selector in neutral for manual transmissions
  - put gear selector in park for automatic transmissions
  - disconnect release mechanism on the automatic parking brake release for testing and reconnect when testing is completed.

- **Do not leave a running engine unattended.**

A moving vehicle can cause injury.

⚠CAUTION

Risk of equipment or circuit damage.

- **Unless specifically directed by manufacturer, make sure ignition is off before connecting or disconnecting connectors or any vehicle electrical terminals.**

- **Do not create a short between battery terminals with a jumper wire or tools.**

Improper equipment use can cause equipment or circuit damage.

⚠CAUTION

Misdiagnosis may lead to incorrect or improper repair and/or adjustment.

- **Do not rely on erratic, questionable, or obviously erroneous test information or results.**
  - If test information or results are erratic, questionable, or obviously erroneous, make sure all connections and data entry information are correct and test procedures were performed correctly.
  - If test information or results are still suspicious, do not use them for diagnosis.

Improper repair and/or adjustment may cause vehicle or equipment damage or unsafe operation.

⚠DANGER

Some vehicles are equipped with air bags.

- **Follow service manual warnings when working around air bag components or wiring.**
  - If service manual instructions are not followed, an air bag may deploy unexpectedly, resulting in injury.
  - Note an air bag can still deploy several minutes after ignition key is off (or even if vehicle battery is disconnected) because of a special energy reserve module.

An air bag opening can cause injury.

Section 1 – Using This Manual

This manual contains instructions for the use and setup of your Scan Tool.

Safety Messages

Refer to ***Safety Precautions*** on page Safety - i.

Check Note

A check note provides additional information about the subject in the preceding paragraph.

Example:

✓ English is the default measurement unit.

Equipment Tips and Lists

Equipment tips and lists provide information that applies to specific equipment. Each tip is introduced by this icon ❒ for easy identification.

Example:

❒ Observe all vehicle and/or equipment manufacturer's cautions and warnings when testing with the Scan Tool.

Equipment Damage

Situations arise during testing that could damage the vehicle or the test equipment. The word **IMPORTANT** signals these situations.

Example:

IMPORTANT Failure to follow these instructions could damage the Scan Tool.

Functions and Selections

Diagnostic and tool functions performed by the Scan Tool are highlighted in **bold**.

Example:

The **View Data** function allows you to view the vehicle's parameter identification (PID) data in real time.

Menus

The menus on the Scan Tool display are referenced in the procedures and are highlighted in ***bold-italic*** text.

Example:

When the **Main Menu** displays, the Scan Tool is ready for use.

Questions and Responses

Messages and user responses are CAPITALIZED.

Example:

The Scan Tool displays the pending DTCs or a message stating ***SYSTEM PASS: NO FAULT DETECTED***.

Manual References

Used to reference other sections of the manual. References include the **Title** and page number (section-page).

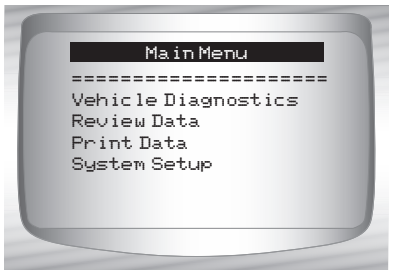
Example:

For more information on DTCs, refer to "**OBD II Diagnostic Trouble Codes (DTCs)**" on page 2-9.

Screens

Certain help messages, information, and data that are displayed on the scan tool are also shown in graphical text boxes. The screens are presented as examples and may change as the software is updated.

Example:



Section 2 – Getting Started

Introduction

The Scan Tool was developed by experts in the automotive service industry to help diagnose vehicles and assist in troubleshooting procedures.

The Scan Tool monitors vehicle events and retrieves codes from the vehicle's control modules to help pinpoint problem areas.

All information, illustrations and specifications contained in this manual are based on the latest information available from industry sources at the time of publication.

No warranty (expressed or implied) can be made for its accuracy or completeness, nor is any responsibility assumed by the manufacturer or anyone connected with it for loss or damages suffered through reliance on any information contained in this manual or misuse of accompanying product. The manufacturer reserves the right to make changes at any time to this manual or accompanying product without obligation to notify any person or organization of such changes.

Download Scanning Suite

- ✓ Go to www.actron.com/downloads and download the Scanning Suite PC application.
- ✓ Scanning Suite is **NOT** required to operate the Scan Tool
- ✓ Install the downloaded Scanning Suite application prior to connecting the Scan Tool to the PC.
- ✓ Some of the items included in Scanning Suite are:
  - ❒ Manuals included with Scan Tool
  - ❒ DTC lookup software
  - ❒ Tool update software
  - ❒ Adobe Acrobat Reader Installer
  - ❒ Print Capture
  - ❒ Other product information
- ✓ To be able to use Scanning Suite the PC must meet the following minimum requirements:
  - ❒ Microsoft Windows 2000, XP, and Vista
  - ❒ Adobe Acrobat Reader
  - ❒ Internet Explorer 4.0 or newer
  - ❒ Screen Resolution of 800 x 600
    - – If screen resolution is 800 x 600, in Display Properties, Settings Tab, set Font Size to Small Fonts.
- ✓ Use Scanning Suite to determine if any updates are available for your tool by clicking Check for Update button.
- ✓ You can also configure the Scanning Suite Frequency (SS Frequency) to automatically check every xx minutes. The default frequency is 30 minutes.
- ✓ Refer to instructions provided on www.actron.com/downloads for how to install Scanning Suite and Tool updates.

Vehicle Service Information

The following is a list of web sites and phone numbers where electronic engine control (EEC) diagnostic information is available.

✓ Some manuals may be available at your local dealer, auto parts stores or local public libraries.

Domestic Vehicles	Web Site	Phone Number
General Motors		
Chevrolet	www.chevrolet.com	1-800-551-4123
Pontiac	www.pontiac.com	1-800-551-4123
Oldsmobile	www.oldsmobile.com	1-800-551-4123
Buick	www.buick.com	1-800-551-4123
Cadillac	www.cadillac.com	1-800-333-4CAD
Saturn	www.saturn.com	1-800-553-6000
Ford		
Ford	www.ford.com	1-800-392-3673
Lincoln	www.lincoln.com	1-800-392-3673
Mercury	www.mercury.com	1-800-392-3673
Chrysler		
Chrysler	www.chrysler.com	1-800-348-4696
Dodge	www.dodge.com	1-800-348-4696
Plymouth	Not Available	1-800-348-4696
Eagle	Not Available	1-800-348-4696

European Vehicles		
Audi	www.audi.com	1-800-544-8021
Volkswagon	www.vw.com	1-800-544-8021
BMW	www.bmw.com	1-201-307-4000
MINI	www.mini.com	1-201-307-4000
Jaguar	www.jaguar.com	1-800-4-JAGUAR
Volvo	www.volvo.com	1-800-458-1552
Mercedes-Benz	www.mercedes-benz.com	1-800-367-6372
Land Rover	www.landrover.com	1-800-637-6837
Porsche	www.porsche.com	1-800-PORSCHE
Saab	www.saab.com	1-800-955-9007

Asian Vehicles	Web Site	Phone Number

Acura	www.acura.com	1-800-999-1009
Honda	www.honda.com	1-800-999-1009
Lexus	www.lexus.com	1-800-255-3987
Scion	www.scion.com	1.866.70.SCION
Toyota	www.toyota.com	1-800-GO-TOYOTA
Hyundai	www.hyundai.com	1-800-633-5151
Infiniti	www.infiniti.com	1-800-662-6200
Nissan	www.nissanusa.com	1-800-nissan1
Kia	www.kia.com	1-800-333-4542
Mazda	www.mazda.com	1-800-222-5500
Daewoo	www.daewoo.com	1-822-759-2114
Subaru	www.subaru.com	1-800-SUBARU3
Isuzu	www.isuzu.com	1-800-255-6727
Geo	Not Available	Not Available
Mitsubishi	www.mitsubishi.com	1-888-MITSU2004
Suzuki	www.suzukiauto.com	1-800-934-0934

Other Manuals

Chilton Book Company	www.chiltonsonline.com	1-800-347-7707
Haynes Publications	www.haynes.com	1-800-242-4637
Bentley Publishers	www.bentleypublishers.com	1-800-423-4595

Repair Information Programs

Mitchell	www.mitchell1.com	1-888-724-6742
ALLDATA	www.alldata.com	1-800-697-2533

Suitable Manual Titles

Diagnostic Service Manuals

PowerTrain Codes and Oxygen Sensors

Automotive Emission Control Manual

Fuel Injection

Automotive Electrical Manual

Automotive Electrics and Electronics

Automotive Sensors

Electronic Transmission Control

Emission Control Technology

Engine Management

or similar titles...

OBD II

On-board diagnostics version II (OBD II) is a system that the Society of Automotive Engineers (SAE) developed to standardize automotive electronic diagnosis.

Beginning in 1996, most new vehicles sold in the United States were fully OBD II compliant.

✓ Technicians can now use the same tool to test any OBD II compliant vehicle without special adapters. SAE established guidelines that provide:

- ❒ A universal connector, called the DLC, with dedicated pin assignments.
- ❒ A standard location for the DLC, visible under the dash on driver's side.
- ❒ A standard list of diagnostic trouble codes (DTCs) used by all manufacturers.
- ❒ A standard list of parameter identification (PID) data used by all manufacturers.
- ❒ Ability for vehicle systems to record operating conditions when a fault occurs.
- ❒ Expanded diagnostic capabilities that records a code whenever a condition occurs that affects vehicle emissions.
- ❒ Ability to clear stored codes from the vehicle's memory with a Scan Tool.

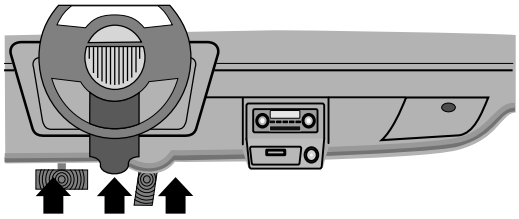
SAE Publications

SAE has published hundreds of pages of text defining a standard communication protocol that establishes hardware, software, and circuit parameters of OBD II systems. Unfortunately, vehicle manufacturers have different interpretations of this standard communications protocol. As a result, the generic OBD II communications scheme varies, depending on the vehicle. SAE publishes recommendations, not laws, but the Environmental Protection Agency (EPA) and California Air Resources Board (CARB) made many of SAE's recommendations legal requirements that vehicle manufacturers were required to phase in over a three-year period. Beginning in 1994, vehicles with a new engine management computer (about 10% of each manufacturers fleet) were supposed to comply with OBD II standards. For 1995, OBD II systems were to appear on about 40% of the new vehicles sold in the United States. Some of the 1994-1995 OBD II systems were not fully compliant, so the Government granted waivers to give manufacturers time to fine-tune their systems. Beginning in 1996, most of the new vehicles sold in the United States were fully OBD II compliant.

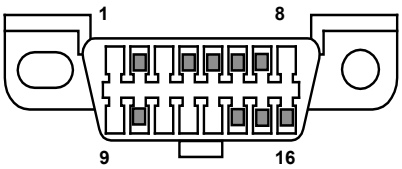
Data Link Connector (DLC)

The data link connector (DLC) allows the Scan Tool to communicate with the vehicle's computer(s).

Beginning in 1996, vehicles sold in the United States use the J1962 (OBD II) DLC, a term taken from a physical and electrical specification number assigned by the SAE (J1962). The DLC should be located under the dashboard on the driver's side of the vehicle. If the DLC is not located under the dashboard as stated, a decal describing its location should be attached to the dashboard in the area the DLC should have been located.



Data Link Connector (DLC) Pins



1 - Manufacturer Reserved
2 - J1850 Bus+
3 - Manufacturer Reserved
4 - Chassis Ground
5 - Signal Ground
6 - CAN High, J-2284
7 - K Line, ISO 9141-2 & ISO/DIS 14230-4
8 - Manufacturer Reserved
9 - Manufacturer Reserved
10 - J1850 Bus-
11 - Manufacturer Reserved
12 - Manufacturer Reserved
13 - Manufacturer Reserved
14 - CAN Low, J-2284
15 - L Line, ISO 9141-2 & ISO/DIS 14230-4
16 - Battery Power

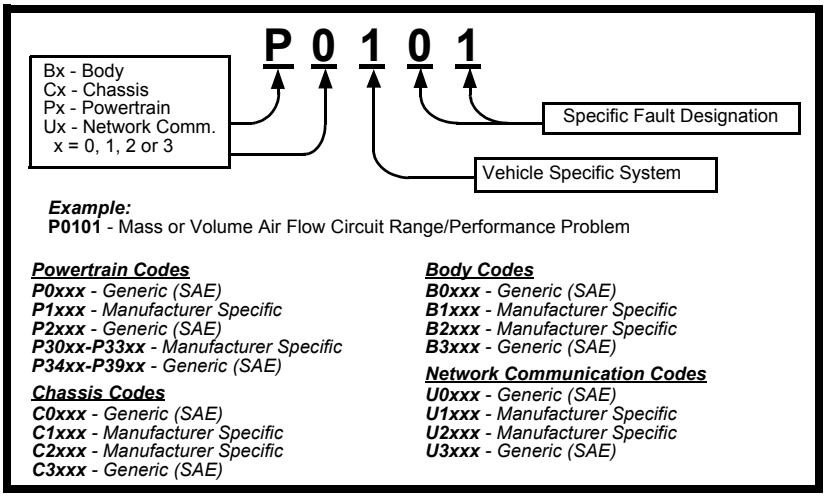
OBD II Diagnostic Trouble Codes (DTCs)

✓ J2012 and ISO 15031-6 are standards for all DTCs, established by the SAE, International Organization for Standardization (ISO) and other governing bodies.

- ❒ Codes and definitions assigned by these specifications are known as Generic OBD II codes.
- ❒ OBD II requires compliance to these standards for all cars, light trucks, APVs, MPVs, and SUVs sold in the United States.
- ❒ Codes not reserved by the SAE are reserved for the manufacturer and referred to as Manufacturer Specific Codes.

✓ DTCs are used to help determine the cause of a problem or problems with a vehicle.

- ❒ DTCs consist of a five-digit alphanumeric code.
- ❒ The DTCs format and general code types are shown below.



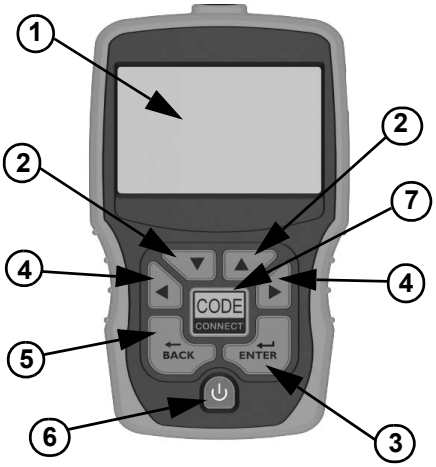
Within each category (Powertrain, Chassis, Body and Network) of DTCs there are assigned ranges for different vehicle systems.

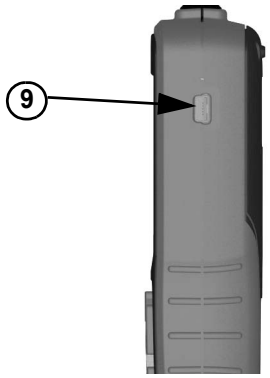
Section 3 – Using The Scan Tool

The Scan Tool

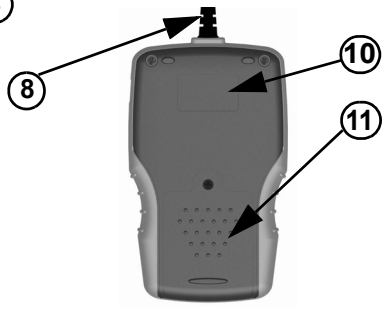
1. **LCD Display** – backlit, 128 x 64 pixel display with contrast adjustment.
2. **UP** and **DOWN** arrow keys – moves selection UP or DOWN.
3. **ENTER** key – selects displayed items.
4. **LEFT** and **RIGHT** arrow keys – selects YES or NO, and selects data parameters for custom data list.
5. **BACK** key – goes to the previous screen or level.
6. **ON/OFF** key – turns power ON or OFF.
7. **CODE CONNECT** – allows the operator to access vehicle-specific repair information.
8. **DLC Cable** – provides connection for vehicle interface.
9. **USB Port** – provides a USB connection for the computer.
10. **Serial Number Plate** – provides serial number of Scan Tool.
11. **Battery Compartment** – provides power to the Scan Tool when reprogramming from a personal computer or off-vehicle reviewing of codes and printing.

Side of Scan Tool





Back of Scan Tool



Specifications

Display: Backlit, 128 x 64 pixel display with contrast adjust
Operating Temperature: 0 to 50°C (32 to 122°F)
Storage Temperature: -20 to 70°C (-4 to 158°F)
Internal Power: 4-AAA Batteries
External Power: 7 to 16 Volts

✓ A minimum of 8.0 V is required for most control modules to operate properly in a vehicle.

Dimensions:	**Height**	**Width**	**Length**
	1.36"	3.40"	5.60"
	34.54 mm	86.36 mm	143.76 mm

Included with Scan Tool

Table 1: Included with Scan Tool

Part	Part Description
USB Cable	Used to print and upgrade tool software.
Quick Start Manual	A short version of the user manual which explains enough tool functionality to get you started using your Scan Tool.

✓ Replacement Parts are available from the manufacturer by contacting customer service.

- Phone at **1-800-228-7667** (8:00 - 8:00 EST Monday - Friday).

Display

The display has a large viewing area for displaying messages, instructions, and diagnostic information.

✓ The back-lit liquid crystal display (LCD) is a 128 x 64 pixel display.

❒ Characters used to help operate the Scan Tool are:

- ✓ Indicates information is available for an item or multiple items.
- ↑ Indicates additional information is available on previous screen by using the ▲ **UP** arrow key.
- ↓ Indicates additional information is available on next screen by using the ▼ **DOWN** arrow key.
- Indicates internal batteries need replaced or are not installed.
- Indicates Code Connect Key is active.
- Indicates graphical viewing available.

Keypad

The keypad is used to move through the different menus of the Scan Tool. The Scan Tool's software is designed for ease in operating and navigating through menus.

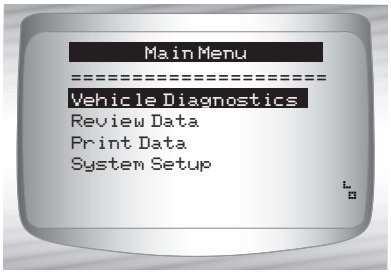
⚠CAUTION Do not use solvents such as alcohol to clean keypad or display. Use a mild nonabrasive detergent and a soft cotton cloth.

⚠CAUTION Do not soak keypad as water might find its way inside the Scan Tool.

Power

Internal Battery

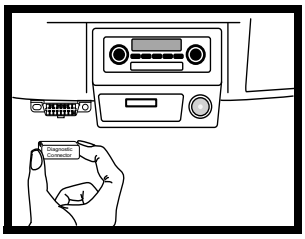
- ✓ Battery power is not required to use tool.
- ✓ **ON/OFF** button on Scan Tool turns tool on and off.
  - ❒ Press and hold **ON/OFF** key for at least 1 second to turn on Scan Tool.
- ✓ The Scan Tool will automatically turn OFF after a user-selectable period of inactivity when powered from the internal batteries.
- ✓ When powered from the internal batteries, the Scan Tool turns off the backlighting for the display if no key presses are made during a 1-minute period.
- ✓ If a key is pressed prior to the Scan Tool powering off, the backlighting for the display will turn back on.
- ✓ The Scan Tool must be attached to the vehicle to perform diagnostic functions. The Scan Tool disables the diagnostic functions when powered from the internal batteries.
- ✓ Each time the Scan Tool is powered up, voltage of the internal battery is checked.
  - ❒ If voltage is low, the Low Battery Symbol ( ) displays on screen.
  - ❒ Replace the battery using instructions provided in Battery Replacement.



⚠CAUTION If the Scan Tool will not be used for an extended period of time, remove the batteries to prevent battery leakage from damaging the battery compartment.

Vehicle Power

When the Scan Tool is connected to the vehicle's DLC, the tool is powered by the vehicle and will automatically turn on once connected.



USB Power

When the tool is connected to a Personal Computer (PC) via the USB cable, the tool will automatically power up.

✓ Refer to **Scan Tool Does Not Power Up** in section 5 **Troubleshooting** on page 5-1 if there are problems.

3 System Setup

✓ ***System Setup*** allows:

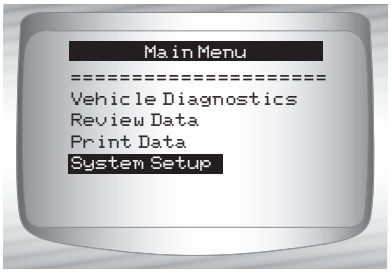
- ❒ Measurement units to be changed.
- ❒ Display contrast to be changed.
- ❒ Auto-Power off time to be changed.
- ❒ Print Header to be turned ON or OFF.
- ❒ Scan Tool information to be viewed.
- ❒ Display to be checked.
- ❒ Operation of the keypad to be checked.
- ❒ Memory of the tool to be checked.
- ❒ Scan Tool to be upgraded.
- ❒ Language to be changed.
- ❒ Quick Test to be turned ON or OFF.

From ***Main Menu*****:**

1.Select *System Setup.*

•Use ▲ **UP** or ▼ **DOWN** arrow key until ***System Setup*** is highlighted.

•Press ENTER **ENTER**.



Changing Measurement Units

✓ English is the default measurement unit.

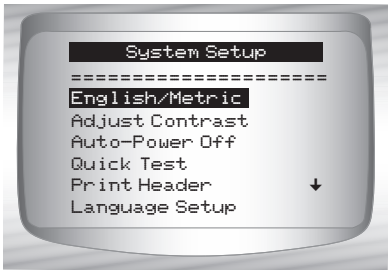
✓ Measurement units can be changed in View and Record Data.

From ***System Setup*** screen:

1.Select *English/Metric.*

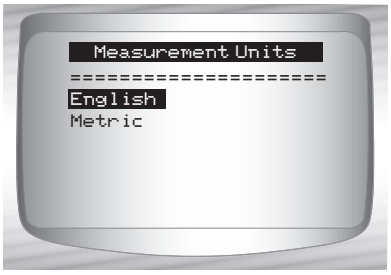
•Use ▲ **UP** or ▼ **DOWN** arrow key until ***English/Metric*** is highlighted.

•Press ENTER **ENTER**.



2.Select Desired Measurement Unit.

•Use ▲ **UP** or ▼ **DOWN** arrow key until desired unit is highlighted.



3.Save Measurement Setting.

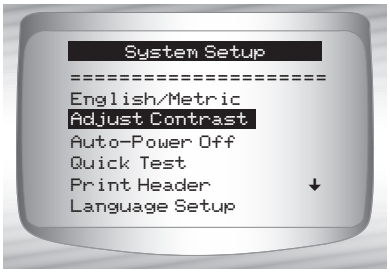
•Press ENTER **ENTER**.

Changing Display Contrast

From ***System Setup*** screen:

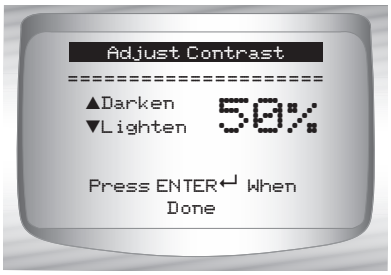
1.Select *Adjust Contrast.*

- Use ▲ **UP** or ▼ **DOWN** arrow key until ***Adjust Contrast*** is highlighted.
- Press ENTER **ENTER**.



2.Increase or Decrease Display Contrast.

- Use ▲ **UP** arrow key to increase Contrast.
- Use ▼ **DOWN** arrow key to decrease Contrast.



3.Save Contrast Setting and return to the ***System Setup*** menu.

- Press ENTER **ENTER**.

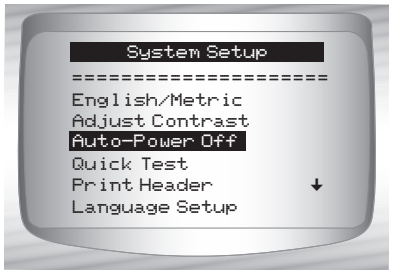
Changing Auto-Power Off

The Auto-Power Off feature allows the tool to turn off automatically after a selected amount of time when tool is not being used. The Auto-Power Off feature will only turn the tool off when it is operating on battery power.

From ***System Setup*** menu:

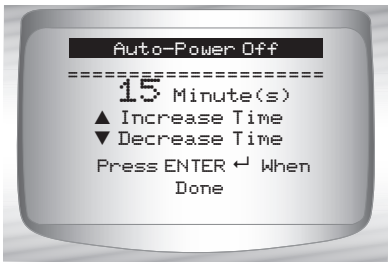
1.Select *Auto-Power Off.*

- Use ▲ **UP** or ▼ **DOWN** arrow key until ***Auto-Power Off*** is highlighted.
- Press ENTER **ENTER**.



2.Increase or Decrease *Auto Power Off* Time.

- Use ▲ **UP** arrow key to increase Time.
- Use ▼ **DOWN** arrow key to decrease Time.



3.Save *Auto Power Off* Time.

- Press ENTER **ENTER**.

Quick Test

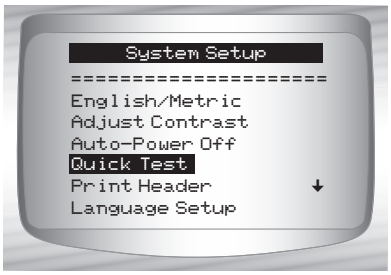
✓ Quick Test is a feature of the tool that occurs the first time the tool establishes communication with the vehicle after vehicle selection. Quick Test will display the results of I/M Monitors and Read Codes. Quick Test is enabled by default.

From ***System Setup*** menu:

1.Select *Quick Test.*

•Use ▲ **UP** or ▼ **DOWN** arrow key until ***Quick Test*** is highlighted.

•Press ENTER **ENTER**.

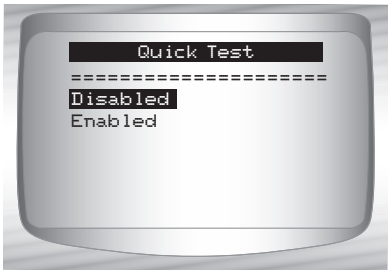


2.Select desired *Quick Test* choice.

•Use ▲ **UP** or ▼ **DOWN** arrow key until desired choice is highlighted.

3.Save Quick Test setting.

• Press ENTER **ENTER**.



Print Header

✓ Print Header selection allows the user to turn off the Scan Tool printing the currently-selected vehicle prior to the retrieved vehicle data when selecting items from the ***Print Data*** menu.

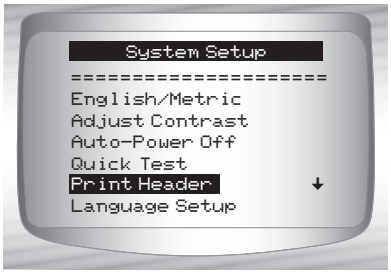
✓ For example, if your currently-selected vehicle is a 2008 Chevrolet Corvette W = 6.2L, this information would print at the top of the page for the data you are printing.

From ***System Setup*** menu:

1.Select *Print Header.*

•Use ▲ **UP** or ▼ **DOWN** arrow key until ***Print Header*** is highlighted.

•Press ENTER **ENTER**.

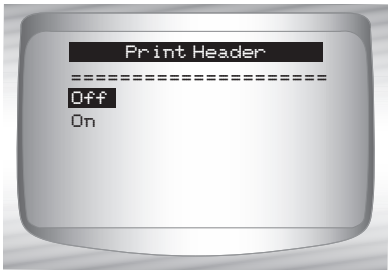


2.Select desired Print Header choice.

•Use ▲ **UP** or ▼ **DOWN** arrow key until desired choice is highlighted.

3.Save Print Header setting.

• Press ENTER **ENTER**.



Language Setup

✓ Language Setup selection allows the user to change the language used by the Tool.

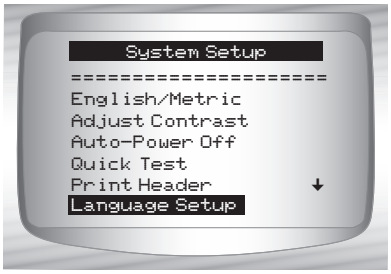
✓ English is the default language.

From ***System Setup*** menu:

1.Select *Language Setup.*

•Use ▲ **UP** or ▼ **DOWN** arrow key until ***Language Setup*** is highlighted.

•Press ENTER **ENTER**.



2.Select desired Language Setup choice.

•Use ▲ **UP** or ▼ **DOWN** arrow key until desired choice is highlighted.

3.Save Language Setup setting.

• Press ENTER **ENTER**.

View Tool Information

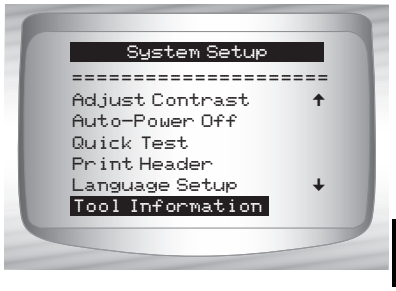
✓ This function allows you to view specific tool information that may be needed when contacting customer service.

From ***System Setup*** menu:

1.Select *Tool Information.*

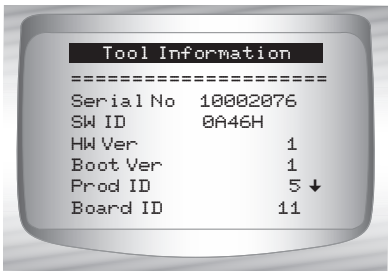
•Use ▲ **UP** or ▼ **DOWN** arrow key until ***Tool Information*** is highlighted.

•Press ENTER **ENTER**.



2.View Information:

- ❒Serial Number (Serial No:)
- ❒Software ID (SW ID:)
- ❒Hardware Version (HW Ver:)
- ❒Boot Version (Boot Ver:)
- ❒Product ID (Prod ID:)
- ❒Board ID (Board ID:)
- ❒Burn Date (Burn Date:)
- ❒Burn Location (Burn Loc:)



3.Write Down Scan Tool Information.

• Space is provided on inside front cover of this manual to record the Scan Tool information.

4.Return to *Setup Tool* Menu.

•Use the BACK **BACK** key.

OR

•Use the ENTER **ENTER** Key.

Display Test

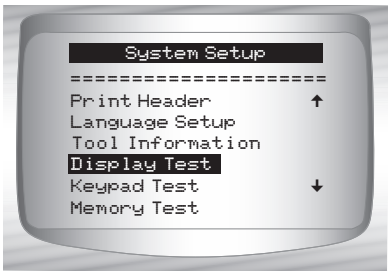
The ***Display Test*** is used to check the display.

✓ The test fills every pixel of the display with a solid black character.

From ***System Setup*** menu:

1. Select *Display Test.*

•Use ▲ **UP** or ▼ **DOWN** arrow key until ***Display Test*** is highlighted.

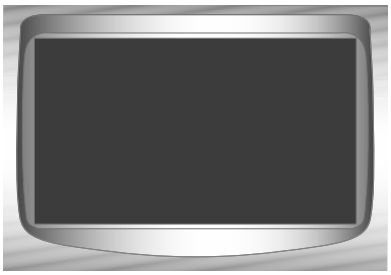


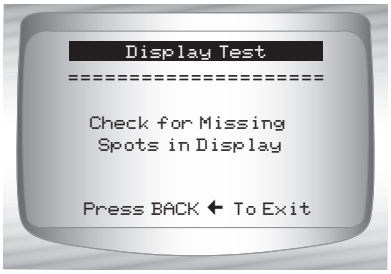
2. Start *Display Test.*

•Press ENTER **ENTER**.

3. Look for Missing Spots.

- All characters display in solid black if there are no concerns.
- Screen flips back and forth between screens shown below.





4. When Done, Press BACK Key.

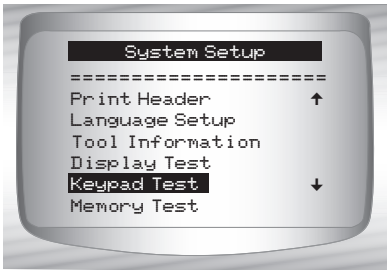
Keypad Test

The ***Keypad Test*** is used to verify keys are working correctly.

From ***System Setup*** menu:

1.Select *Keypad Test.*

- Use **UP** or **DOWN** arrow key until ***Keypad Test*** is highlighted.
- Press **ENTER**.



2. Press a KEY.

- Key name or scroll direction should inverse colors on display.
- The only exception is the **BACK** key. When **BACK** key is pressed, ***System Setup*** menu returns.

✓ If ***System Setup*** menu does not return, then **BACK** key is not working correctly.

Memory Test

✓ The ***Memory Test*** will test RAM and Flash ROM.

✓ Run the ***Memory Test*** if the tool has trouble:

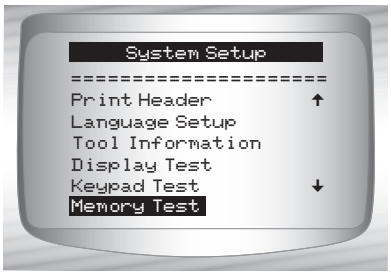
- ❒ Playing back recorded data.
- ❒ Displaying trouble code definitions.

From ***System Setup*** menu:

1.Select *Memory Test.*

•Use UP or **DOWN** arrow key until ***Memory Test*** is highlighted.

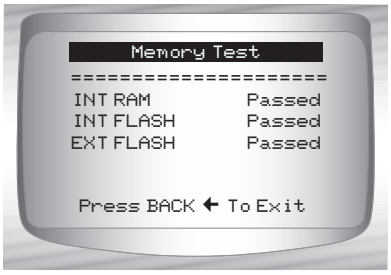
•Press **ENTER**.



❒ ***Memory Test*** may take several minutes to complete.

❒ ***Memory Test*** results display.

- ❒ If no problems were detected, then PASS is displayed
- ❒ If RAM fails, an error message is shown.
- ❒ If FLASH fails, a checksum is shown.

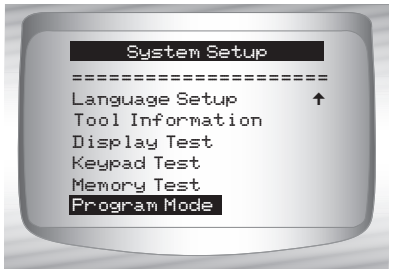


2. Return to *System Setup* menu.

•Press **BACK**.

Program Mode

The ***Program Mode*** is used for updating the Scan Tool. Instructions are provided with upgrades. Refer to **"Download Scanning Suite"** on page 2-2.



Vehicle-Specific Features

Review Data

✓ The ***Review Data*** function allows the user to view the information from the previous vehicle tested.

✓ Scan Tool does not require power from the vehicle to use the ***Review Data*** function.

1. Select *Review Data.*

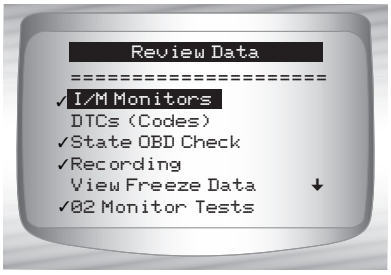
•Use ▲ **UP** or ▼ **DOWN** arrow key until ***Review Data*** is highlighted.

•Press ↵ **ENTER**.

2.Follow prompts and instructions provided by Scan Tool and then select item whose data you wish to review.

✓ The ***Review Data*** menu shows a checkmark next to the item(s) that has data.

✓ If there isn't a checkmark next to the item, then this item can't be selected until the appropriate function is run from the ***Diagnostic Menu***.



✓ Only 1 function, ***Recording***, needs detailed instructions.

Recording

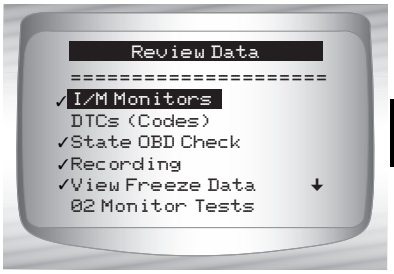
The ***Recording*** function is used to play back a recording.

✓ This function is very similar to ***View Data***. The only difference is that ***View Data*** is real time viewing of PIDs, while ***Recording*** is a viewing of previously recorded PIDs.

From the ***Review Data*** menu:

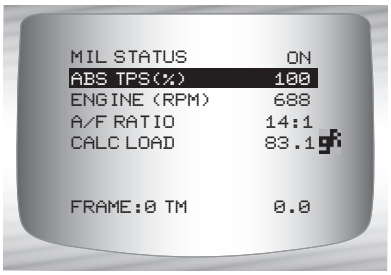
1.Select *Recording.*

•Use ▲ **UP** or ▼ **DOWN** arrow key until ***Recording*** is highlighted.



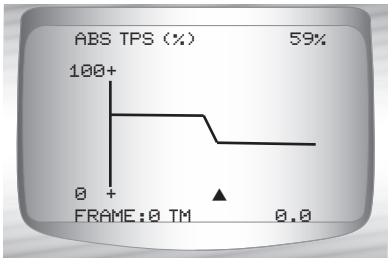
2. Play Back Recording.

✓ The ***Recording*** has frame number and timestamp (in seconds).



- ❒ Negative frames and timestamps indicate data recorded before trigger event.
- ❒ Positive frames and timestamps indicate data recorded after trigger event.
- ❒ Use ▲ **UP** or ▼ **DOWN** arrow keys to view recorded PID data of each frame.
- ❒ Use ◄ **LEFT** or ► **RIGHT** arrow keys to scroll back and forth through frames.
- ❒ See Appendix A for PID Definitions.

❒ If graphing is available for selected PID, the " " icon is located on the side of the screen.
  – Press ENTER **ENTER** to view graph.
  – Press ENTER **ENTER** again to return to ***Recording***.



✓ The triangle below the graph indicates the position of the frame in the graph.

❒ Use ◄ **LEFT** or ► **RIGHT** arrow keys to scroll back and forth through graph.

✓ Different vehicles communicate at different speeds and support a different number of PIDs. Therefore, the maximum number of frames that can be recorded varies.

3.Return to *Review Data* menu***.***
•Press BACK **BACK.**

Print Data

The **Print Data** function allows the printing of diagnostic information stored in the Scan Tool.

✓ The Scan Tool's internal battery power can be used to print data.

✓ Use the **Print Header** function to turn On/Off printing vehicle information prior to printing data.

✓ Make sure you have previously downloaded and installed the Scanning Suite PC software from www.actron.com. Refer to **"Download Scanning Suite"** on page 2-2.

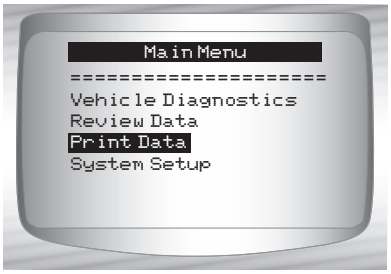
✓ Launch Scanning Suite and then start printing application.

✓ Follow all instructions on PC.

1. Select *Print Data.*

•Use ▲ **UP** or ▼ **DOWN** arrow key until ***Print Data*** is highlighted.

•Press ENTER **ENTER**.



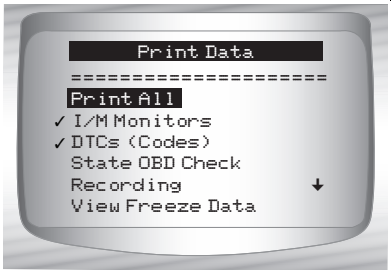
✓ On the ***Print Data*** menu, **Print All** prints all data collected by the Scan Tool.

✓ When printing a Recording, Start Frame and End Frame need to be defined.

2. Select Data To Be Printed.

•Use ▲ **UP** or ▼ **DOWN** arrow key.

•Press ENTER **ENTER**.



✓ The ***Print Data*** menu shows a check mark next to the items that have data.

✓ If there isn't a checkmark next to the item, then this item can't be selected until the appropriate function is run from the **Diagnostic Menu**.

3. Return to *Select Print Data* screen.

•Press BACK **BACK.**

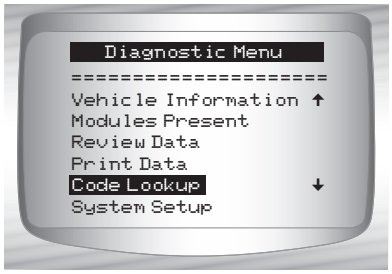
Code Lookup

Code Lookup is used to look up definitions of DTCs stored in the Scan Tool.

✓ The Scan Tool does not require power from the vehicle to perform this function.

From **Diagnostic Menu**:

1. **Select *Code Lookup.***
   - •Use ▲ **UP** or ▼ **DOWN** arrow key until ***Code Lookup*** is highlighted.
   - •Press ENTER **ENTER**.

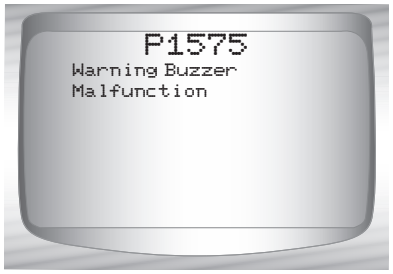


2. **Enter code.**
   - •All characters must be entered
   - •Only one character can be changed at a time.
   - •Use ◄ **LEFT** or ► **RIGHT** arrow keys to scroll to desired digit.
   - •Use ▲ **UP** or ▼ **DOWN** arrow keys to change selected digit.
   - • Press ENTER **ENTER**.

✓ Some vehicles may have an additional screen asking in which system to look for a code.

✓ If definition could not be found, the Scan Tool displays No DTC Definition Found. See Service Manual.

✓ To enter another DTC, press **BACK**.



✓ Press **BACK** again to return to the ***Diagnostic Menu***.

Connecting The Scan Tool

To diagnose a vehicle, connect the DLC cable to the vehicle's DLC. Refer to **"Data Link Connector (DLC)"** on page 2-8 of **Getting Started.**

If you just want to power up the tool to do self-tests, code lookup, review or printing data from the last vehicle tested, then you do not need to attach the cable to the DLC. The internal battery provides power for this.

✓ For more information on OBD II connectors, go to http://www.obdclearinghouse.com/oemdb.

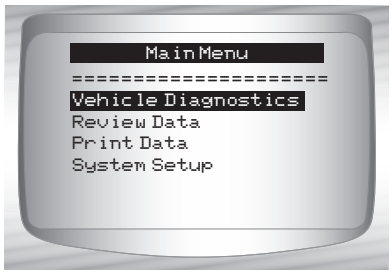
Vehicle Selection

From ***Main Menu:***

1.Select *Vehicle Diagnostics*.

•Use ▲ **UP** or ▼ **DOWN** arrow key until ***Vehicle Diagnostics*** is highlighted.

•Press ENTER **ENTER**.

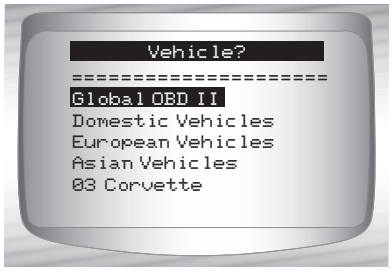


2.Select appropriate region for vehicle.

•Use ▲ **UP** or ▼ **DOWN** arrow key to highlight:

❒Global OBD II
❒Domestic Vehicles
❒European Vehicles
❒Asian Vehicles
❒Previous Vehicle

•Press ENTER **ENTER**.



✓ The Global OBD II selection is provided for vehicles that are not listed. It is a good idea to always select your specific vehicle when listed to get the most benefit from your tool.

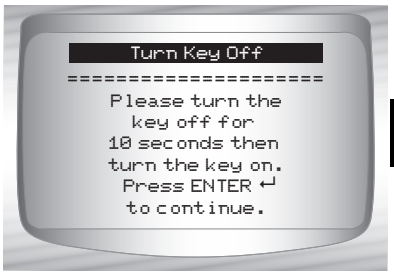
✓ If you have previously selected a vehicle it will appear as a menu selection after Asian vehicles. On the screen shown, the 2003 Corvette is the previous vehicle.

✓ If you select the previous vehicle, the tool will proceed to the ***Diagnostic*** menu.

✓ If you wish to select a vehicle other than the previous vehicle, then choose between Global OBD II, Domestic Vehicles, European Vehicles, or Asian Vehicles and continue making selections until the vehicle selection is complete.

✓ The following screen only displays when power comes from vehicle.

- Turn vehicle key off for 10 seconds.
- Turn vehicle key back to the on position.
- Press ENTER **ENTER** on the Scan Tool.



✓ If you select a vehicle different than your previous vehicle, all retrieved vehicle data currently stored in your tool will be erased.

✓ If you select the previous vehicle, all stored vehicle data will be retained until it is overwritten by the corresponding function selected from the ***Diagnostic Menu***.

Code Connect Feature

Code Connect is an experience-based database derived from over 3.6 million phone calls from technicians seeking assistance diagnosing repair problems on their vehicles. Code Connect brings the technology of professional technicians to a DIY scan tool. Don't waste time trying to find the answer. With the information Code Connect offers, it takes vehicle repairs to the next level. Since you now know the most probable fix for your problem, you can decide if you want to tackle the repair yourself, or bring the vehicle to a local automotive repair facility.

IMPORTANT In order for Code Connect to work, you must select your specific vehicle during vehicle selection. A Global OBD II vehicle selection will not provide any Code Connect information. The power of Code Connect is that repair information is vehicle and trouble code specific and is based on the largest experience-based database available.

Code Connect information is available whenever the Code Connect icon is visible on the display. The Code Connect icon has the potential of being displayed while trouble codes are being displayed from Read Codes or while Viewing Freeze Frame data. Also, when you print codes to your PC, the Code Connect information, if available, will also be printed.

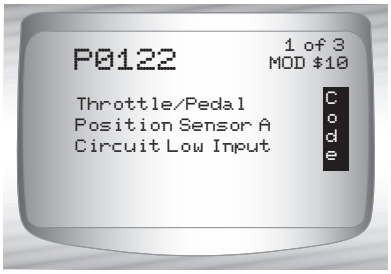
✓ Code Connect information is currently only available in English, so if your tool is set to Spanish or French, don't be alarmed if your DTC text is in one language and your Code Connect information is shown in English.

How to use ***Code Connect:***

1.When the Code ***Code Connect*** icon is shown on the display, press the CODE CONNECT **CODE CONNECT** key.

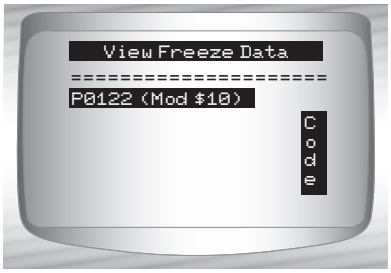
•While viewing trouble codes:

•Refer to **"Read Codes"** on page 4-7 for more information.

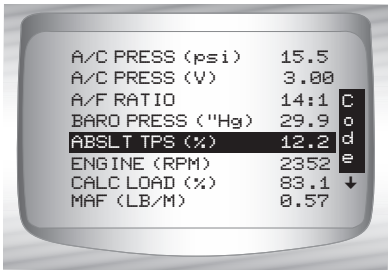


•While in the ***View Freeze Data Menu***:

•Refer to **"View Freeze Data"** on page 4-25 for more information.

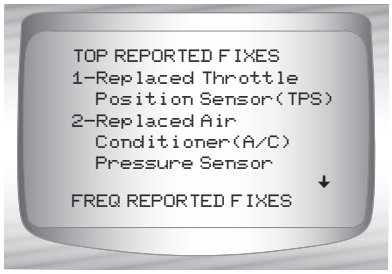


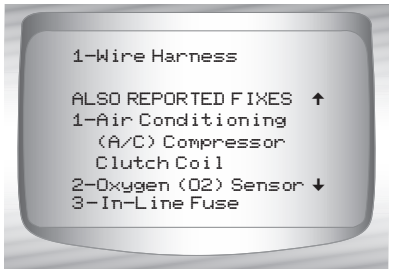
•While viewing freeze data:

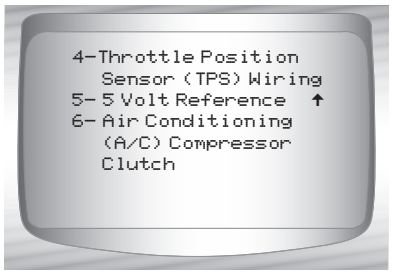


2.Scroll through the code-specific repair information.

- Use ▲ **UP** or ▼ **DOWN** arrow keys to scroll one line at a time.
- Use ◄ **LEFT** or ► **RIGHT** arrow keys to scroll 8 lines at a time, or a whole screen.







There are 3 levels of reported fixes provided in the Code Connect database.

Fix Level	Description
Top Reported Fix	More likely to be the solution over other choices provided.
Frequently Reported Fix	As likely as other solutions.
Also Reported Fix	Less likely than other solutions provided, but worth considering.

3.To return to the screen from where you pressed the CODE CONNECT key, press BACK.

Section 4 – Diagnostic Menu

✓ The first time the scan tool links to the vehicle, the communication protocol is automatically detected, and is used until the Scan Tool is turned off or another vehicle is diagnosed.

✓ If an **Error Message** displays, make sure the OBDII connector is attached, and the ignition key is on. Cycle ignition key to off for 10 seconds, then on. This may be required to reset computer. If required, select yes to try again. If problem still exists, refer to "**Error Messages**" on page 5-1 of **Troubleshooting**.

✓ The Scan Tool keeps all data received from the last vehicle selected until any of the following occurs:

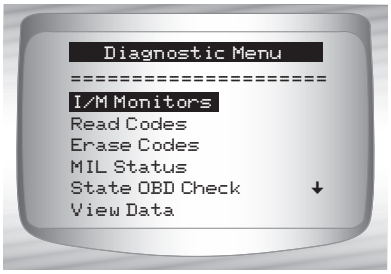
- ❒ A new vehicle is selected.
- ❒ Scan Tool is flash programmed to update software.

✓ On initial link to vehicle, Scan Tool checks the status of **I/M Monitors** no matter which function is selected.

Diagnostic Menu

IMPORTANT **Review Data, Print Data, Code Lookup,** and **System Setup** are covered in section 3 of this manual. These items are not covered in this section.

✓ The ***Diagnostic Menu*** is broken down into the following selections:



- ❒ **I/M Monitors**
- ❒ **Read Codes**
- ❒ **Erase Codes**
- ❒ **MIL Status**
- ❒ **State OBD Check**
- ❒ **View Data**
- ❒ **Record Data**
- ❒ **View Freeze Data**
- ❒ **Drive Cycle Monitor**
- ❒ **O2 Monitor Tests**
- ❒ **Diag Monitor Tests**
- ❒ **On-Board Systems**
- ❒ **Vehicle Information**
- ❒ **Modules Present**
- ❒ **Review Data**
- ❒ **Print Data**
  - – I/M Monitors
  - – DTCs (Codes)
  - – State OBD Check
  - – Recording
  - – View Freeze Data
  - – O2 Monitor Tests
  - – Diag Monitor Tests
  - – Vehicle Information
  - – Modules Present

(List Continued)

- ❒ **Code Lookup**
- ❒ **System Setup**
  - English/Metric
  - Adjust Contrast
  - Auto-Power Off
  - Quick Test
  - Print Header
  - Language Setup
  - Tool Information
  - Display Test
  - Keypad Test
  - Memory Test
  - Program Mode

I/M Monitors (Emissions)

The ***I/M Monitors*** (Inspection / Maintenance) function is used to view a **snapshot** of the operations for the emission system on OBD II vehicles.

✓ I/M Monitors is a very useful function. To guarantee no faults exist make sure all monitors are **ok** or **n/a** and **no DTC's** exist.

✓ Refer to the vehicles service manual for the drive cycle operation.

✓ During normal driving conditions, the vehicle's computer scans the emission system. After a specific amount of drive time (each monitor has specific driving conditions and time required), the computer's monitors decide if the vehicles emission system is working correctly or not as well as detecting out of range values. When the monitor's status is:

- **ok -** vehicle was driven enough to complete the monitor.
- **inc (Incomplete) -** vehicle was not driven enough to complete the monitor.
- **n/a (Not Applicable)-** vehicle does not support that monitor.

✓ Depending on vehicle, disconnecting or a discharged battery may erase DTCs and clear monitor status.

✓ Monitors may be cleared by:

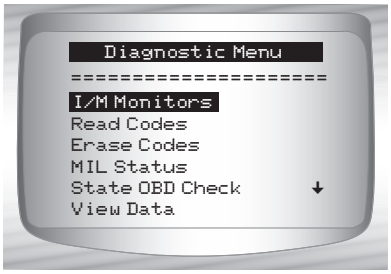
- ❒ Erasing codes
- ❒ Vehicle control modules losing powerk

✓ ***I/M Monitors*** can be done key on engine running (KOER) or key on engine off (KOEO).

✓ Extreme weather and/or road conditions can prevent a monitor from running. Also, some monitors may require a cold start to complete.

From the ***Diagnostic Menu:***

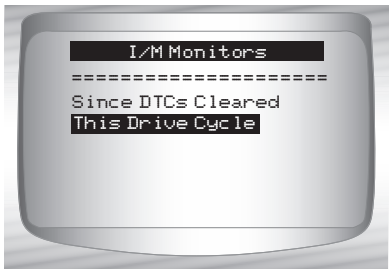
1. **Select *I/M Monitors.***
   •Use ▲ **UP** or ▼ **DOWN** arrow key until ***I/M Monitors*** is highlighted.
   •Press ENTER **ENTER.**



Two types of ***I/M Monitors*** test are:

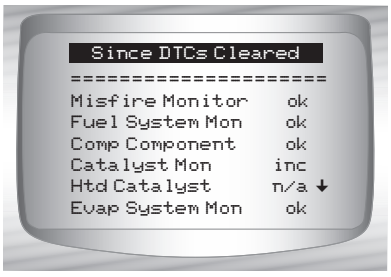
- ❒ ***Since DTCs Cleared -*** shows status of the monitors since the DTCs were last erased.
- ❒ ***This Drive Cycle -*** shows status of monitors since the start of the current drive cycle. Refer to the vehicle service manual for more detailed information on emission-related monitors and their status.

✓ Some vehicles **do not** support ***This Drive Cycle***. If vehicle supports both types of monitors the ***I/M Monitors Menu*** displays.

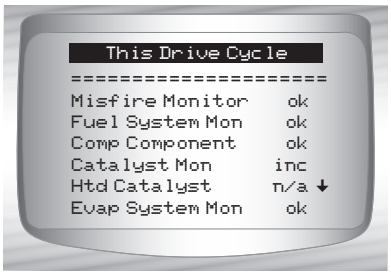


2. **View Summary of Monitor Status.**
   •Use ▲ **UP** or ▼ **DOWN** arrow key (if required).

✓ Depending on ***Monitor Test*** one of these 2 screens will be present



OR



Abbreviations and names for OBD II Monitors supported by the Scan Tool are shown below. They are required by the United States Environmental Protection Agency (EPA). Not all monitors are supported by all vehicles.

•**Abbreviated Name**	**Expanded Name**
- Misfire Monitor	Misfire Monitor
- Fuel System Mon	Fuel System Monitor
- Comp Component	Comprehensive Components Monitor
- Catalyst Mon	Catalyst Monitor
- Htd Catalyst	Heated Catalyst Monitor
- Evap System Mon	Evaporative System Monitor
- Sec Air System	Secondary Air System Monitor
- A/C Refrig Mon	Air Conditioning Refrigerant Monitor
- Oxygen Sens Mon	Oxygen Sensor Monitor
- Oxygen Sens Htr	Oxygen Sensor Heater Monitor
- EGR System Mon	Exhaust Gas Recirculation System Monitor

3. **Return to *Diagnostic Menu.***
   •Press **BACK**.

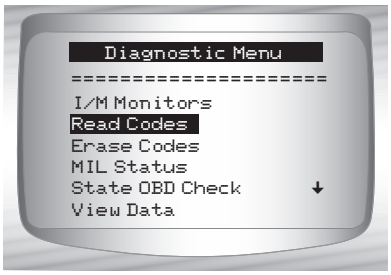
Read Codes

✓ The ***Read Codes*** function allows the Scan Tool to read the DTCs from the vehicle's control modules. DTCs are used to help determine the cause of a problem or problems with a vehicle. These codes cause the control module to illuminate the malfunction indicator lamp (MIL) when emission-related or driveability fault occurs. MIL is also known as service engine soon or check engine lamp.

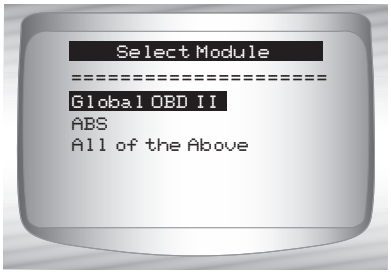
✓ ***Read Codes*** can be done with the key on engine off (KOEO) or with the key on engine running (KOER).

From ***Diagnostic Menu***:

1. **Select *Read Codes.***
   - Use ▲ **UP** or ▼ **DOWN** arrow key until ***Read Codes*** is highlighted.
   - Press ENTER **ENTER.**



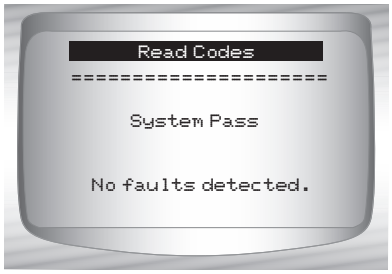
2. **If more than one module is supported, a menu is displayed.**
   - Use ▲ **UP** or ▼ **DOWN** arrow key until desired choice is highlighted.
   - Press ENTER **ENTER.**



4

✓ If no DTCs are present a message stating ***System Pass: No Faults Detected*** is displayed.

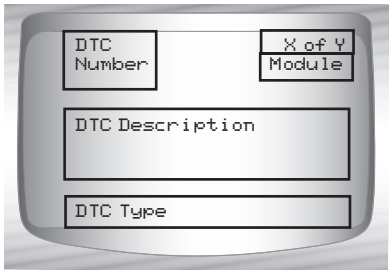
✓ If you selected All of the Above from the ***Select Module*** menu, then all of the codes will be displayed as if you picked all menu items individually.



3.View and write down the DTCs.

•Use the ▲ **UP** or ▼ **DOWN** arrow keys.

❒ The screen at the right shows where the Read Codes information is located.



DTC Number - number of the trouble code that you will find in vehicle service information.

X of Y - Indication that you are viewing code x of y, where x is the code you are viewing of the total y.

Module - This field is where the name of the module (e.g. ABS) or address of the module (e.g. Mod $28) or both are shown (ABS $28). The table below describes modules supported.

Module	Description
ABS	Anti-lock Brake System module.
Global OBD II	This selection will communicate with the vehicle using Global OBD II. See **Introduction to On-Board Diagnostics**.

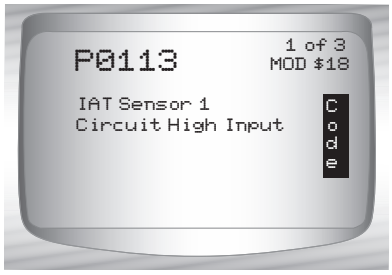
DTC Description - This area is reserved for the text describing the trouble code listed in the DTC number field.

DTC Type - This area is reserved for providing additional information about the DTC. Multiple DTC types may be possible for a given DTC number. Not all vehicles support DTC types. The table on the next page describes possible DTC types.

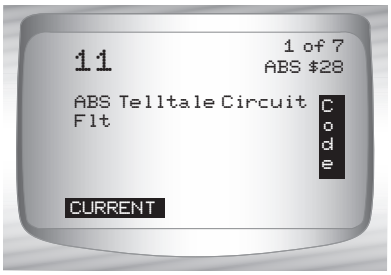
DTC Type	Description
History	Intermittent codes placed in the vehicle's memory when the trouble originally occurred, and will remain there even if the trouble has been corrected. If no trouble after 50 engine warm-up cycles, the DTC will be erased.
Current	Codes transmitted through the PCMs data stream when a trouble condition is active and cannot be erased. The problem must be repaired to remove the DTC.
Intermittent	Indicates the current code has been set at least once but possibly not enough to cause a history code to be stored.
MIL	Indicates that this DTC has turned on the MIL light.
Pending	Pending codes are also referred to as continuous monitor or maturing codes. An intermittent fault causes the control module to store a code in memory. If the fault does not occur within a certain number of warm-up cycles (depending on vehicle), the code clears from memory. If fault occurs a specific number of times, the code matures into a DTC and the MIL illuminates or blinks. This function can be used with KOEO or KOER.
Non-MIL	DTC that is not emission-related and did not turn on the MIL light.

Several screen examples are shown on the following page.

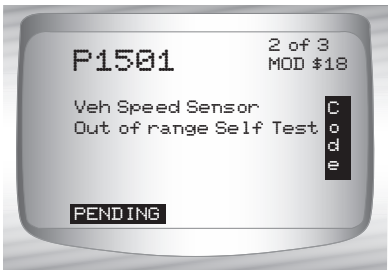
❒ In this example, module (MOD) $18 is reporting the DTCs.



❒ In this example, the ABS Module is reporting a Current Code. The $28 is the ABS module address.



❒ Pending indicates a Global OBD II pending code.



✓ Code icon indicates that the CODE CONNECT **CODE CONNECT** key is active. Press the CODE CONNECT **CODE CONNECT** key to display repair information. Refer to **"Code Connect"** on page 3-26.

4. Return to *Diagnostic Menu.*

• Press BACK **BACK.**

Erase Codes

The ***Erase Codes*** function deletes DTCs and ***I/M Monitor*** data from vehicle's control module(s). Perform this function key on engine off (KOEO). **Do not start the engine.**

✓ The ***Erase Codes*** function may also erase ***View Freeze Data***, ***O2 Monitor Tests***, and ***Diagnostic Monitor Test*** results depending on vehicle.

✓ The ***Erase Codes*** function sets monitors to ***inc***.

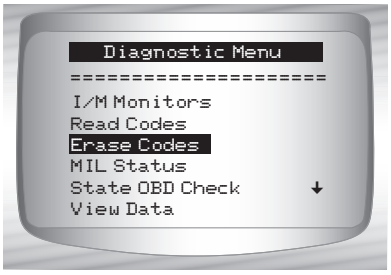
✓ Perform ***Erase Codes*** function **only** after systems have been checked completely and DTCs have been written down.

✓ After servicing the vehicle, erase stored DTCs and verify no codes have returned. If a DTC returns, problem has not been fixed or other faults are present.

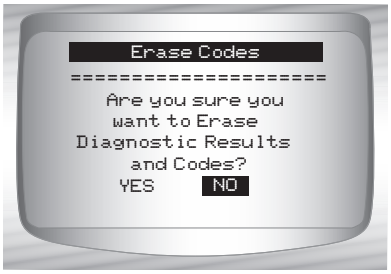
✓ Depending on which monitor sets a code the vehicle may need to be driven and the monitor ran before concluding that the fault is repaired.

From ***Diagnostic Menu:***

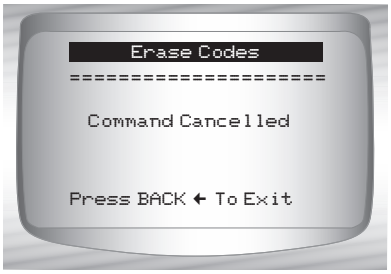
1. **Select *Erase Codes.***
   - Use ▲ **UP** or ▼ **DOWN** arrow key until ***Erase Codes*** is highlighted.
   - Press ENTER **ENTER.**



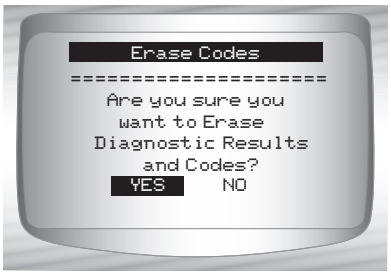
✓ If diagnostic results and codes are not to be erased select **No** and press ENTER **ENTER.**



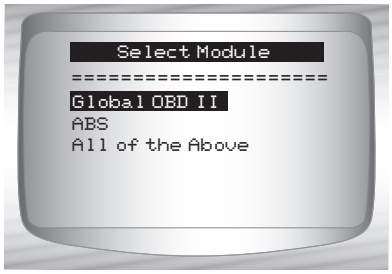
•Selecting **No** displays a ***Command Cancelled*** message.



2. **Select Yes to erase diagnostic results and codes.**
   •Use ◄ **LEFT** arrow key.
   •Press ENTER **ENTER.**



3. **If more than one module is supported, a menu is displayed.**
   •Use ▲ **UP** or ▼ **DOWN** arrow key until desired choice is highlighted.
   •Press ENTER **ENTER.**



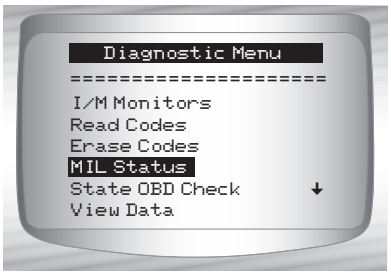
4. **Observe *Command Sent* message is displayed.**
   •Press ENTER **ENTER.**

5. **Return to *Diagnostic Menu*.**
   •Press ENTER **ENTER.**

MIL Status

From ***Diagnostic Menu:***

1. **Select *MIL Status.***
   - Use ▲ **UP** or ▼ **DOWN** arrow key until ***MIL Status*** is highlighted.
   - Press ENTER **ENTER.**



2. **View *MIL Status.***
   - Press ENTER **ENTER** to return to ***Diagnostic Menu***.

State OBD Check

The ***State OBD Check*** function is used to display a basic status of the vehicles OBD system.

- ❒ Malfunction Indicator Lamp (MIL) Status
- ❒ Codes Found
- ❒ I/M Monitors

✓ Erase Codes deletes DTCs and clears I/M Monitors from vehicle's computer module(s).

✓ The ***State OBD Check*** function has the following areas:

- ❒ MIL STATUS ON or OFF
- ❒ Number of Codes Found
- ❒ Number of Monitors OK
- ❒ Number of Monitors Inc
- ❒ Number of Monitors N/A

✓ ***State OBD Check*** should be done with the key on engine running (KOER) due to showing MIL status.

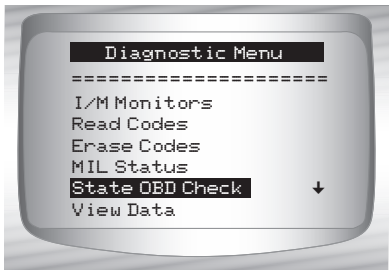
✓ The number of codes found are **only** Global OBD II codes and **not** Pending codes.

✓ The number of Monitors that are either OK, INC or NA are **only** Since DTCs Cleared and **not** This Drive Cycle.

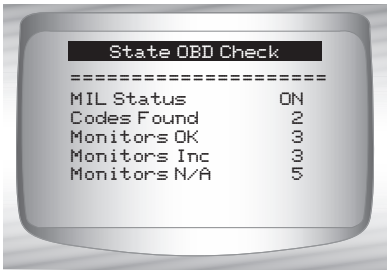
✓ Refer to ***Read Codes*** and ***I/M Monitors*** for more detailed information about the results.

From the ***Diagnostic Menu:***

1. **Select *State OBD Check***
   - Use ▲ **UP** or ▼ **DOWN** arrow key until ***State OBD Check*** is highlighted
   - Press ENTER **ENTER.**



2. **View State OBD Check Display.**



3. **Return to *Diagnostic Menu*.**
   - Press BACK **BACK**

View Data

The ***View Data*** function allows real time viewing of the vehicle's computer module's Parameter Identification (PID) data. As the computer monitors the vehicle, information is simultaneously transmitted to scan tool.

✓ View data allows the following items to be viewed on the scan tool:

- ❒ Sensor data
- ❒ Operation of switches
- ❒ Operation of solenoids
- ❒ Operation of relays

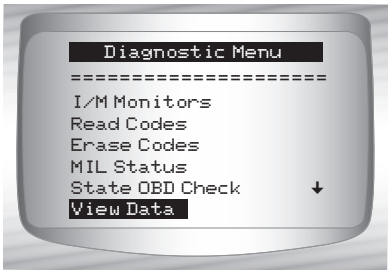
✓ View data can be shown as:

- ❒ Entire Data List
- ❒ Custom Data List

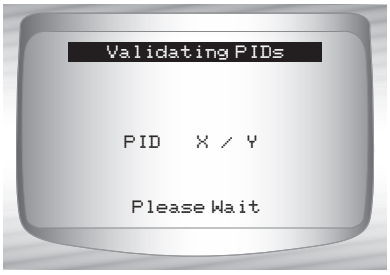
✓ Apart from ***Read Codes***, ***View Data*** is the most useful diagnostic function for isolating the cause of a vehicle operation problem.

From ***Diagnostic Menu***:

1. **Select *View Data.***
   - •Use ▲ **UP** or ▼ **DOWN** arrow key until ***View Data*** is highlighted.
   - •Press ↵ **ENTER.**



2. **Observe while Scan Tool validates PID MAP.**



✓ PID MAP validation is the tool asking the vehicle which PIDs are supported. See Appendix A for a complete list of PIDs supported by the tool.

✓ Multiple PIDs may be sent if vehicle is equipped with more than one computer module (for example a powertrain control module [PCM] and a transmission control module [TCM]). The Scan Tool identifies them by their identification names (ID) assigned by manufacturer (i.e. $10 or $1A).

✓ If one or more control module stops responding, the Scan Tool displays a message.

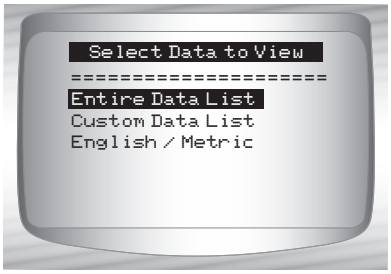
- ❒ If continuing, dashes will replace data in right hand column.
- ❒ If no is selected, then the Scan Tool attempts to re-establish communication with that module.

View Entire List.

✓ ***View Entire List*** shows all supported PID data for the vehicle being tested.

From ***Select Data to View*** menu:

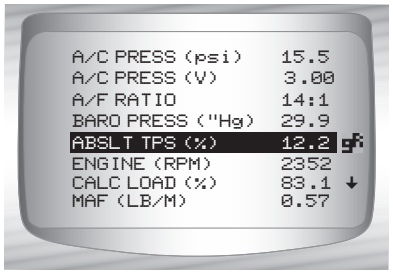
1. **Select *Entire Data List.***
   - Use ▲ **UP** or ▼ **DOWN** arrow key until ***Entire Data List*** is highlighted.
   - Press ENTER **ENTER.**



2. View PIDs on Scan Tool.

•Use **UP** or **DOWN** arrow key.

•See Appendix A for PID Definitions.



If the icon displays while a PID is selected press **ENTER** to view graph.

3. Return to *PID Screen.*

•Press **BACK**.

4. Return to *Select Data to View Menu.*

•Press **BACK**.

5. Return to *Diagnostic Menu.*

•Press **BACK**.

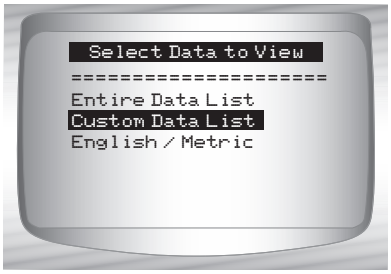
4

Custom List Select

✓ The ***Custom Data List*** allows certain PIDs from the ***View Entire Data List***, such as those PIDs that apply to a specific driveability symptom or system, to be selected.

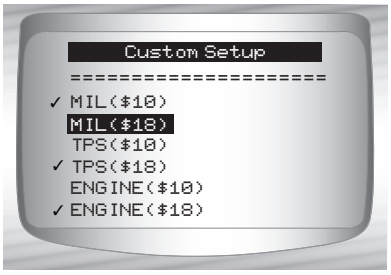
From ***Select Data to View*** menu:

1. **Select *Custom List Select.***
   - Use ▲ **UP** or ▼ **DOWN** arrow key until ***Custom Data List*** is highlighted.
   - Press ↵ **ENTER.**



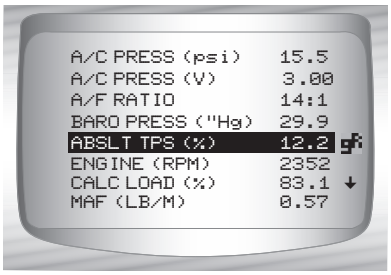
2. **Select View Instructions or Not.**
   - Use ◄ **LEFT** or ► **RIGHT** arrow key.
   - Press ↵ **ENTER.**

3. **Select PIDs to View.**
   - Use ▲ **UP** or ▼ **DOWN** arrow keys to move up and down list
   - The ► **RIGHT** arrow selects or deselects data parameter. All selected data values are marked with a ✓ symbol.
   - The ◄ **LEFT** arrow deselects all marked data parameters.
   - The ↵ **ENTER** key starts recording data, or displaying selected data parameters.

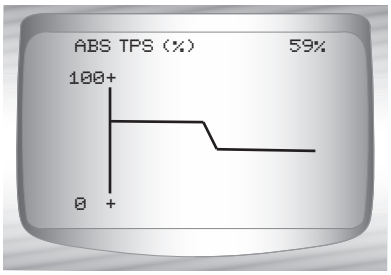


✓ Selected PIDs are kept until you exit ***View Data*** and return to the ***Diagnostic Menu***.

4. **View PIDs on Scan Tool.**
   - Use ▲ **UP** or ▼ **DOWN** arrow key.
   - See Appendix A for PID Definitions.



✓ If the icon displays while a PID is selected press **ENTER** to view graph. Press **BACK** key to Return to ***PID Screen***.



5. **Return to *Select Data to View Menu.***
   •Press **BACK**.

6. **Return to *Diagnostic Menu.***
   •Press **BACK**.

Record Data

✓ The ***Record Data*** function records PIDs while vehicle is parked or being driven.

✓ The ***Record Data*** function is mainly used for diagnosing intermittent driveability problems that cannot be isolated by any other method.

✓ The recording time varies. A recording consists of frames of data prior to the trigger and several frames after the trigger.

⚠CAUTION **Two people must be in vehicle when driving. One to drive and the other to operate the Scan Tool.**

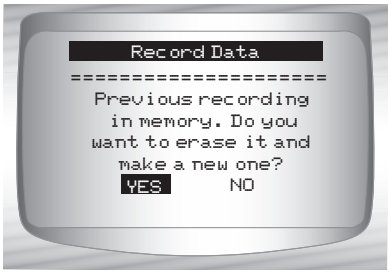
From ***Diagnostic Menu***:

1. **Select *Record Data.***
   - Use ▲ **UP** or ▼ **DOWN** arrow key until ***Record Data*** is highlighted.
   - Press ENTER **ENTER.**

✓ Follow all instructions on display.

✓ The ScanTool can maintain only one recording. Make sure to thoroughly review old recording before erasing.

✓ If a recording currently exists in memory, a message prompting to erase data is displayed.



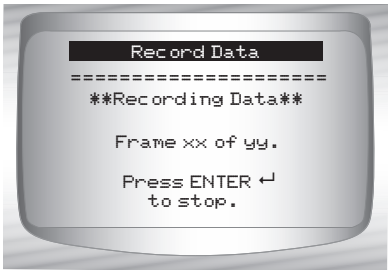
✓ Scan Tool validates list of global PIDs from vehicle.

2. **Refer to *View Data* to setup *Custom List* or *View Entire List*.**

3. **Press ENTER ENTER to start recording.**

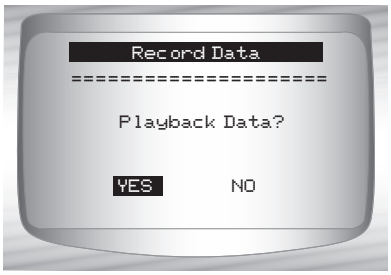
✓ Data continues to be saved until either:

- ❒ Record memory is full.
- ❒ Operator presses ENTER **ENTER**.



✓ Scan Tool recording times vary. A recording consists of frames of data prior to trigger and several frames after trigger.

4. **After recording, Scan Tool displays a prompt to *Playback Data*.**
   - Answer ***No*** to return to ***Diagnostic Menu***.
   - Answer ***Yes*** to display recorded data.
     - ❒Refer to **"Recording"** on page 3-19 for instructions on how to ***Playback Data.***



4

View Freeze Data

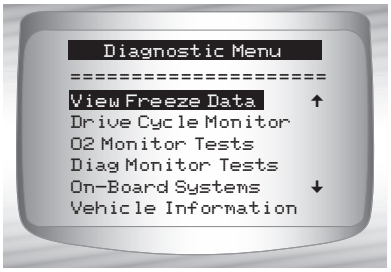
When an emission-related fault occurs, certain vehicle conditions are recorded by the on-board computer. This information is referred to as freeze frame data. ***View Freeze Data*** is a snapshot of the operating conditions at the time of an emission-related fault.

✓ ***View Freeze Data*** can be overwritten by faults with a higher priority.

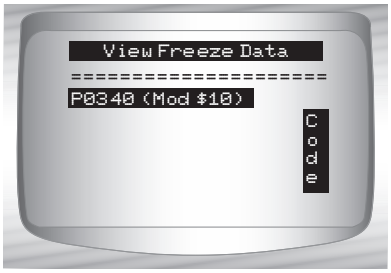
✓ If codes were erased, ***View Freeze Data*** may not be stored in vehicle memory depending on vehicle.

From the ***Diagnostic Menu:***

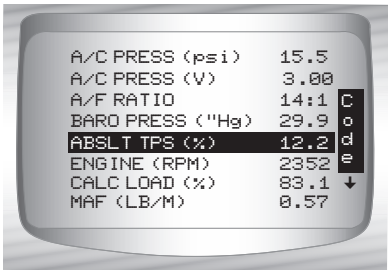
1. **Select *View Freeze Data.***
   - Use ▲ **UP** or ▼ **DOWN** arrow key until ***View Freeze Data*** is highlighted.
   - Press ENTER **ENTER.**



2. **Select Frame (if more than 1 frame is present).**
   - Use ▲ **UP** or ▼ **DOWN** arrow key.
   - Press ENTER **ENTER.**



3. **View PIDs on Scan Tool.**
   - Use ▲ **UP** or ▼ **DOWN** arrow key.
   - See Appendix A for PID Definitions.



✓

icon indicates that the CODE CONNECT **CODE CONNECT** key is active. Press the CODE CONNECT **CODE CONNECT** key to display repair information. Refer to **"Code Connect"** on page 3-26.

4. **Select another frame to view (if available).**
   •Press BACK **BACK**.

5. **Return to *Diagnostic Menu.***
   •Press BACK **BACK**.

4

Drive Cycle Monitor

The ***Drive Cycle Monitor*** function is very similar to the I/M Monitors though the ***Drive Cycle Monitor*** is used to view **REAL TIME** operations of the Emissions System on OBD II vehicles.

✓ ***Drive Cycle Monitor*** continuously updates as the vehicle reports operations of the Emission System.

⚠CAUTION **Two people must be in vehicle when driving. One to drive and the other to operate the Scan Tool.**

✓ Refer to the vehicle service manual for the drive cycle operation.

✓ Drive Cycle Monitor can be used if you want to drive the vehicle until all of the monitors are OK.

✓ During normal driving conditions, the vehicle computer scans the emission system. After a specific amount of drive time (each monitor has specific driving conditions and time requirements), the computer's monitors will decide if the vehicle emissions system is working correctly or not as well as detecting out a range of values. When the monitor's status is:

- **"ok"** - vehicle has been driven enough for function.
- **"inc" (Incomplete)** - vehicle was not driven enough to complete all of the monitors.
- **"n/a" (Not Applicable)** - vehicle does not support that monitor.

✓ **Clear Monitors by:**

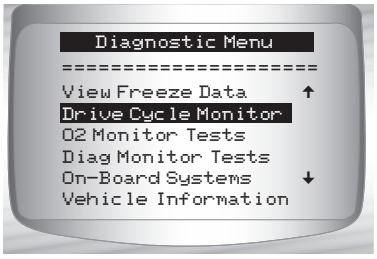
❒ Erasing Codes.
❒ Vehicle Computer Module losing power (on some vehicles).

From the ***Diagnostic Menu:***

1. Select *Drive Cycle Monitor.*

•Use ▲ **UP** or ▼ **DOWN** arrow key to highlight ***Drive Cycle Monitors***.

•Press ENTER **ENTER**.

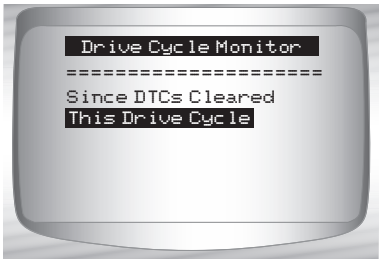


✓ Two types of ***Drive Cycle Monitors*** are:

- ❒ ***SINCE DTCs CLEARED*** shows status of the monitors since the Diagnostic Trouble Codes were last erased.
- ❒ ***THIS DRIVE CYCLE*** shows status of monitors since start of current drive cycle. Refer to the vehicle service manual for more detailed information on emission-related monitors and their status.

4

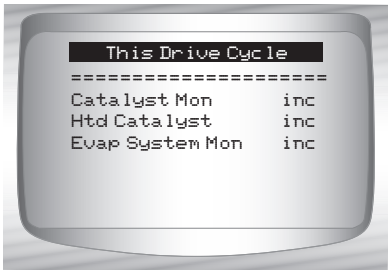
✓ Some vehicles **DO NOT** support ***Drive Cycle Monitors***. If vehicle supports both types of ***Drive Cycle Monitors*** the Menu will display.



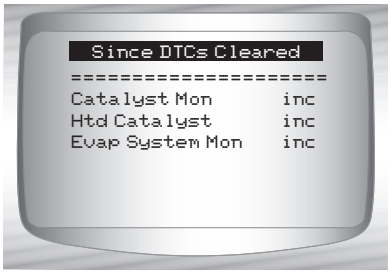
2. View Summary of Monitor Status.

•Use ▲ **UP** or ▼ **DOWN** arrow key (if required).

3. Depending on the ***Drive Cycle Monitors*** one of these 2 screens will be present.



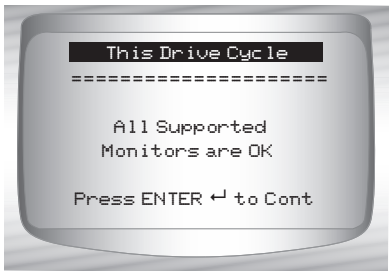
OR



✓ The Scan Tool display is continuously updated. Monitors that are “ok” will disappear and only the “inc” monitors will remain displayed. Monitors designated “n/a” are not displayed.

4

✓ When all Monitors are **“OK”** the following Screen is shown.



OR

4.Return to *Diagnostic Menu.*

• Press **BACK** key.

O2 Monitor Tests

OBD II regulations require applicable vehicles monitor and test oxygen (O2) sensors to determine problems related to fuel and emissions. The ***O2 Monitor Tests*** allows retrieval of completed O2 sensors monitor test results.

✓ **The *O2 Monitor Tests* is not an on-demand test.** O2 sensors are **not** tested when selected via the menu. O2 sensors are tested when engine operating conditions are within specified limits.

✓ If the vehicle communicates using a controller area network (CAN), O2 monitor tests are not supported by vehicle. A message is displayed. See **"Diagnostic Monitor Tests"** on page 4-33 to see O2 monitor data.

✓ O2 sensors are located before (upstream) and after (downstream) catalyst(s). Sensors are named (xy) for their position to both cylinder banks and catalysts.

- ❒ The O2 sensor for cylinder bank 1 has prefix **1**y while O2 sensor for cylinder bank 2 has prefix **2**y.
- ❒ The O2 sensor upstream of catalyst (closest to engine) has suffix x**1** while O2 sensor downstream of catalyst has suffix x**2**. If vehicle contains more catalysts, O2 sensor downstream of second catalyst has suffix x**3** and O2 sensor downstream of next catalyst has suffix x**4**.
- ❒ For example, **O2S21** is upstream O2 sensor for cylinder bank 2.

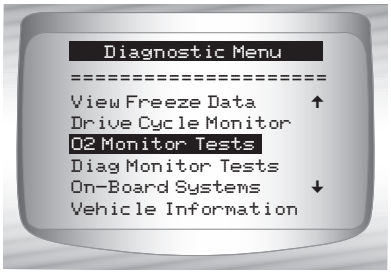
The following *O2 Sensor Tests* are available:

1) Rich-to-lean sensor threshold voltage
2) Lean-to-rich sensor threshold voltage
3) Low sensor voltage for switch time
4) High sensor voltage for switch time
5) Rich-to-lean sensor switch time
6) Lean-to-rich sensor switch time
7) Minimum sensor voltage test cycle
8) Maximum sensor voltage test cycle
9) Time between sensor transitions
10) Sensor period
11) Manufacturer specific tests

From the ***Diagnostic Menu:***

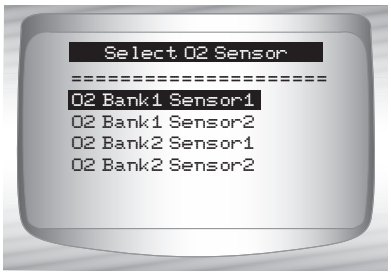
1. Select ***O2 Monitor Tests.***

- Use ▲ **UP** or ▼ **DOWN** arrow key until ***O2 Monitor Tests*** is highlighted.
- Press ↵ **ENTER**.



2. ***Select O2 Sensor.***

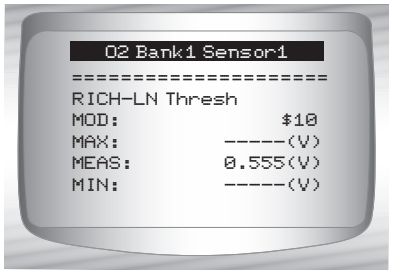
- Use ▲ **UP** or ▼ **DOWN** arrow key until desired O2 Sensor is highlighted.
- Press ↵ **ENTER.**



✓ The O2 sensors located upstream (before catalyst) may perform differently than ones located downstream (after catalyst).

✓ Test IDs are shown for unknown O2 sensor tests.

3. **View Results of Selection.**
   •Use ▲ **UP** or ▼ **DOWN** arrow key.



4. **Return to *O2 Sensor Tests* menu.**
   •Press BACK **BACK**.

5. **Return to *Diagnostic Menu.***
   •Press BACK **BACK**.

Diagnostic Monitor Tests

The ***Diagnostic Monitor Test*** function is useful after servicing or after erasing a vehicle's memory. Test results do not necessarily indicate a faulty component or system.

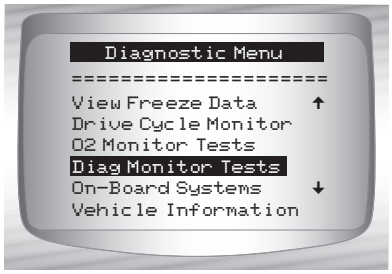
✓ *Non-CAN vehicles* ***Diagnostic Monitor Test*** receives test results for emission-related powertrain components and systems that are **not continuously monitored.**

✓ *CAN vehicles* ***Diagnostic Monitor Test*** receives test results for emission-related powertrain components and systems that **are and are not continuously monitored.**

✓ Vehicle manufacturer is responsible for assigning test and component IDs.

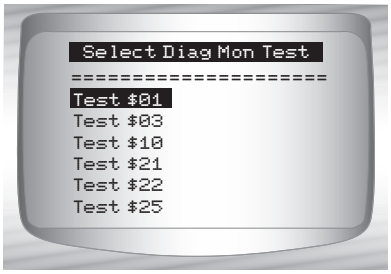
From the ***Diagnostic Menu:***

1. **Select *Diag Monitor Tests.***
   - Use ▲ **UP** or ▼ **DOWN** arrow key until ***Diag Monitor Tests*** is highlighted.
   - Press ENTER **ENTER.**



✓ Applicable ***Diagnostic Monitor Tests*** are displayed.

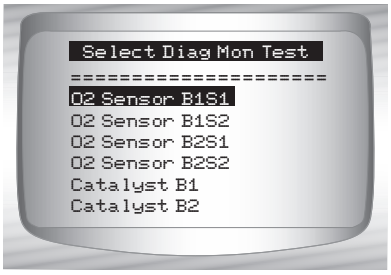
2. **Review test results displayed on Scan Tool.**
   - Use ▲ **UP** or ▼ **DOWN** arrow key until desired test results is highlighted.
   - Press ENTER **ENTER.**



Non-CAN Vehicles

OR

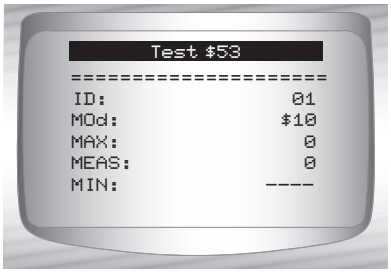
✓ Refer to appropriate vehicle service manual for test IDs and definitions.



CAN Vehicles

✓ On *Non-CAN vehicles* the Scan Tool displays:

- ❒ Test data (test ID)
- ❒ Maximum value (MAX)
- ❒ Test measurements (MEAS)
- ❒ Minimum value (MIN)
- ❒ Status (STS)
- ❒ Measurements and Specification values are hexadecimal numbers (i.e., $1A, $FE, $11.)
- ❒ Module (MOD)

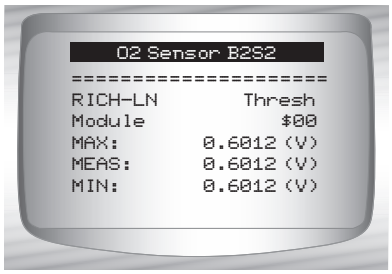


Non-CAN Vehicles

OR

✓ On *CAN vehicles* Scan Tool displays:

- ❒ Test performed. The test performed can be $## if test is not defined. Refer to vehicle service manual for details.
- ❒ Measured values and units of measured (such as volts, amps, and seconds).
- ❒ Status of monitor test data.
- ❒ Module ID where the monitor test data came from.



CAN Vehicles

3. Return to *Select Test Menu.*
•Press BACK **BACK** key.

4. Return to *Diagnostic Menu.*
•Press BACK **BACK** key.

On-Board Systems

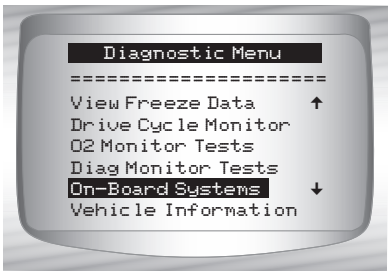
The ***On-Board Systems*** test allows the Scan Tool to control operation of vehicle components, tests or systems.

✓ Some manufacturers do not allow tools to control vehicle systems. A vehicle not supporting an on-board system is identified by a message that is displayed when selected.

✓ Refer to the vehicle service manual for on-board systems instructions.

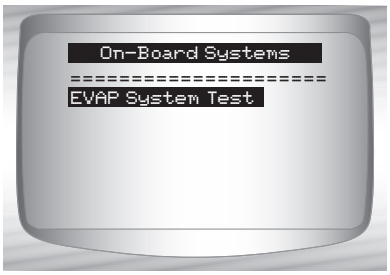
From the **Diagnostic Menu:**

1. **Select *On-Board Systems.***
   - •Use ▲ **UP** or ▼ **DOWN** arrow key until ***On-Board Systems*** is highlighted.
   - •Press ENTER **ENTER.**



✓ A list of on-board systems and components available for testing are shown on the display.

2. **Select Test.**
   - •Use ▲ **UP** or ▼ **DOWN** arrow key.
   - •Press ENTER **ENTER**.



3. **Return to *On-Board Systems*** menu.
   - •Press BACK **BACK** key.

4. **Return to *Diagnostic Menu.***
   - •Press BACK **BACK** key.

✓ The manufacturer is responsible for determining the criteria to automatically stop test. Refer to appropriate vehicle service manual.

Vehicle Information

The ***Vehicle Information*** function allows the Scan Tool to request the vehicle's VIN number, calibration ID(s) which identifies software version in vehicle control module(s), calibration verification numbers (CVN(s)) and in-use performance tracking.

✓ ***Vehicle Information*** function applies to model year 2000 and newer OBD II compliant vehicles.

✓ The Scan Tool cannot verify if data is correct for scanned vehicles.

✓ CVNs are calculated values required by OBD II regulations.

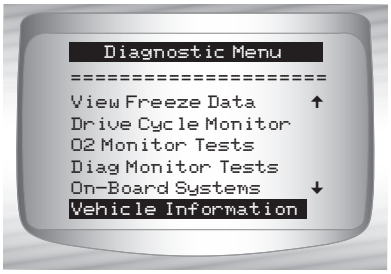
✓ The CVN calculation may take several minutes.

✓ CVNs are reported to determine if emission-related calibrations have been changed. Multiple CVNs may be reported for a control module.

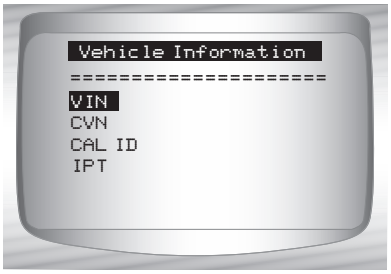
✓ In-use performance tracking, tracks performance of key I/M Monitors.

From the **Diagnostic Menu:**

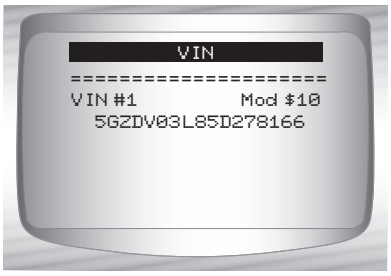
1. **Select *Vehicle Information*.**
   - Use **UP** or **DOWN** arrow key until ***Vehicle Information*** is highlighted.
   - Press **ENTER.**

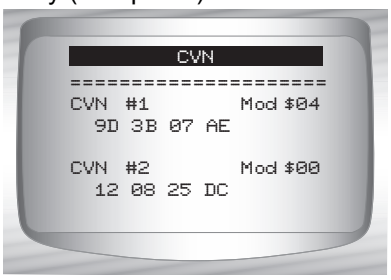


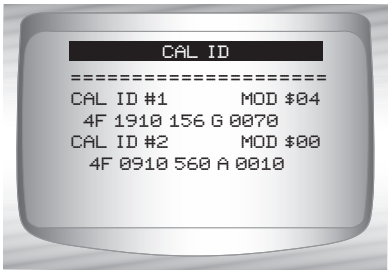
2. **Select information to view from Menu.**
   - Use ▲ **UP** or ▼ **DOWN** arrow key to highlight desired selection.
   - Press ENTER **ENTER.**

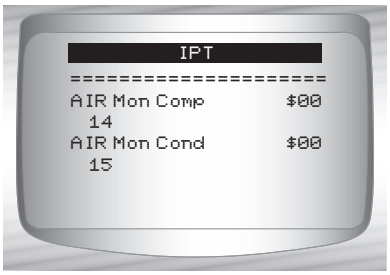


3. **View Information Supported by Vehicle.**
   - Use ▲ UP or ▼ DOWN arrow key (if required).









4

✓ In the above examples, Module $00 and $04 returned data. Scroll down to view information. CVNs are shown as hexadecimal numbers.

✓ Abbreviations and names for in-use performance tracking data supported by Scan Tool are shown below. Not all data is supported by all vehicles.

Abbreviated Name	Expanded Name
In-Use Perf Tracking	In-Use Performance Tracking
OBD Mon Cond	OBD Monitoring Conditions Encountered Counts
Ignition Cycles	Ignition Counter
Cat Comp Bank x	Catalyst Monitor Completion Counts Bank x
Cat Cond Bank x	Catalyst Monitor Conditions Encountered Counts Bank x
O2 Comp Bank x	O2 Sensor Monitor Completion Counts Bank x
O2 Cond Bank x	O2 Sensor Conditions Encountered Counts Bank x
EGR Mon Comp	EGR Monitor Completion Condition Counts
EGR Mon Cond	EGR Monitor Conditions Encountered Counts
AIR Mon Comp	AIR Monitor Completion Condition Counts (Secondary Air)
AIR Mon Cond	AIR Monitor Conditions Encountered Counts (Secondary Air)
EVAP Mon Comp	EVAP Monitor Completion Condition Counts
EVAP Mon Cond	EVAP Monitor Conditions Encountered Counts

✓ If message INVALID displays on screen, then data returned from the vehicle is incorrect, or is not formatted in accordance with OBD II specification.

4. **Return to *Vehicle Information Menu:***
   •Press **BACK** key.

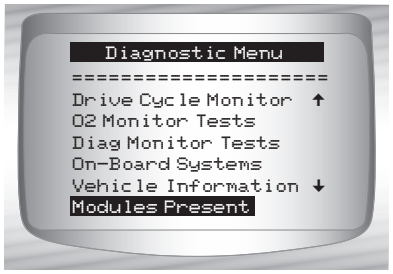
5. **Return to *Diagnostic Menu:***
   •Press **BACK**.

Modules Present

The Scan Tool identifies the module IDs and communication type for all Global OBD II modules in the vehicle.

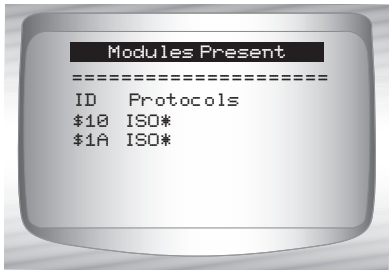
From the **Diagnostic Menu:**

1. **Select *Modules Present.***
   - Use ▲ **UP** or ▼ **DOWN** arrow key until ***Modules Present*** is highlighted.
   - Press ENTER **ENTER.**

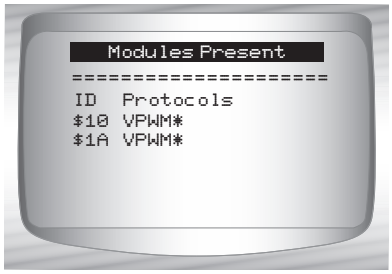


✓ The types of protocols (communication types) supported by the Scan Tool are:

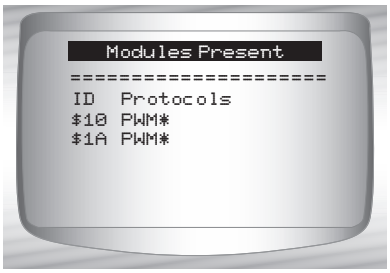
❒ ISO 9141-2 protocol is shown as ISO.



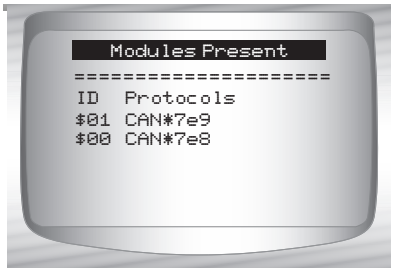
❒ SAE J1850 protocol is shown as VPWM or PWM.



OR

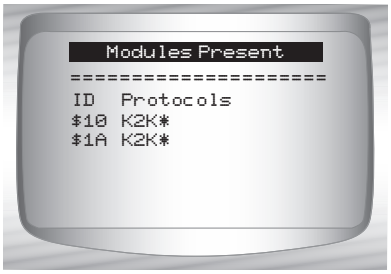


❒ ISO 15765-4 protocol is shown as CAN.



✓ Since CAN vehicles use module IDs larger than 2 digits, the Scan Tool assigns a 2 digit module ID to be used in place of the actual CAN module ID. The module ID assigned for the CAN module ID is used in all functions of the Scan Tool.

❒ ISO 14230-4 protocol is shown as K2K (Keyword 2000).



✓ In the above examples, the * indicates the protocol used to communicate to the vehicle's control module.

4

Section 5 – Troubleshooting

Error Messages

Check the following if an error message displays:

- ❒ Verify ignition key is in the ON and not in the ACCESSORIES position.
- ❒ Make sure the DLC Cable is attached to vehicle's data link connector (DLC) and Scan Tool.
- ❒ Look at DLC and check for cracked or recessed pins, or for any substance that could prevent a good electrical connection.
- ❒ Test for continuity between the DLC wiring and the computer. In an extreme case, there may be a broken wire.
- ❒ Check for bent or broken pins.
- ❒ With the engine off, check for blown fuses in the vehicle fuse box.
- ❒ Make sure the vehicle's control module has a good ground. If the computer case is grounded, then clean the connection and apply a conductive (dielectric) grease to the mating surfaces.
- ❒ With the key on engine off (KOEO), verify battery voltage is at least 8.0V
- ❒ Verify the control module is not defective. Refer to the service manual to diagnose the control module.

Scan Tool Does Not Power Up

✓ Review **Safety Precautions** before troubleshooting.

If Scan Tool will not power up, communicate with vehicle's control module, pass Scan Tool self-tests, or functions incorrectly in any other way, do the following:

- ❒ Check and replace the batteries if needed.
- ❒ Clean the DLC pins.
- ❒ Disconnect and reconnect DLC making sure it is connected correctly.
- ❒ Check vehicle battery to make sure at least 8.0 volts is present.
- ❒ Contact customer service.
- ❒ With the engine off, check for blown fuses in the vehicle fuse box.

Vehicle Communication Fault

The vehicle's control module(s) enters into an unrecoverable state.

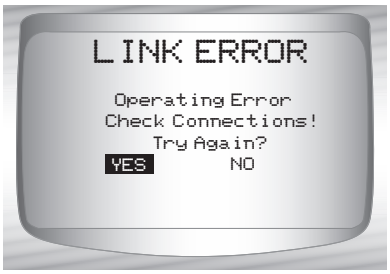
1. **Turn vehicle key to off position.**
   - Wait 10 seconds.
   - Press ENTER **ENTER.**

Operating Error or Erroneous Data

An **Operating Error** or **Erroneous Data** occurs if vehicle's computer(s) stop(s) communicating with Scan Tool.

1.Make Selection

- Use **LEFT** or **RIGHT** arrow key.
- Press **ENTER.**



✓ See "**Error Messages**" on page 5-1 for possible causes.

Battery Replacement

The Scan Tool requires 4-AAA alkaline batteries to operate without vehicle power.

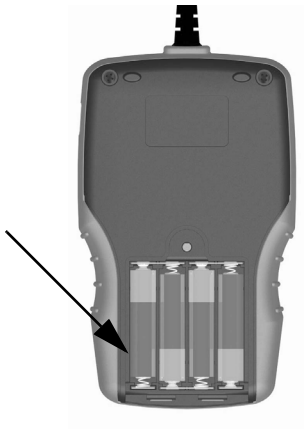
5

✓ When the batteries need to be replaced, the low-battery icon ( ) is displayed.

✓ Rechargeable batteries do not last as long as alkaline types and are not recommended.

✓ Non-rechargeable Lithium (Li) battery can be used. Though Lithium types last longer than the alkaline types, they are more expensive.

1. Place Display Face Down.
- On non-abrasive surface.



2. Remove Battery Cover.
- Turning phillips screw counterclockwise.
- Slide battery cover off.

3. Remove Batteries and Properly Discard.

4. Install New Batteries.
- 4-AAA Alkaline Batteries.

5. Reinstall Battery Cover.
- Slide battery cover on.
- Install phillips screw turning it clockwise.
- Do not overtighten screw.

Tool Self-Tests

Tool Self-Tests check the display, keys, and internal memory.

✓ Refer to **Using The Scan Tool** section of the manual for the operation procedures for Scan Tool self-tests.

Technical Support

- Toll-Free Number: **1-800-228-7667**.

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Appendix A – PID Definitions

NOTE: The Tool only displays the PIDs the vehicle supports.

Tool	Description	Tool	Description
ABS EVAP VP	Absolute Evaporative Emission System Vapor Pressure	FUEL TYPE	Type of Fuel in Vehicle
ABS FRP	Absolute Fuel Rail Pressure	IAT	Intake Air Temperature
ABS LOAD	Absolute Load Value	IGN ADV	Ignition Advance
ABSLT TPS	Absolute Throttle Position	LT FTRM x	Bank x Long Term Air to Fuel Ratio Correction Factor
ACC POS REL	Relative Accelerator Pedal Position	LT SEC FTx	Long Term Secondary O2 Sensor Fuel Trim Bank x
ACC POS x	Accelerator Position x	MAF	Mass Air Flow Sensor
ALCOHOL	Alcohol in Fuel Percentage	MAP	Manifold Absolute Pressure
BARO PRS	Barometric Pressure	MIL DIST	Distance Since Malfunction Indicator Lamp Came On
CALC LOAD	Calculated Engine Load	MIL STATUS	Malfunction Indicator Lamp Light Status
CAT TEMP xy	Catalytic Converter Temperature Bank x, Sensor y	MIL TIME	Time Since Malfunction Indicator Lamp Was Activated
CLR DIST	Distance Since Codes Cleared	O2S	O2 Sensor Output
CLR TIME	Time Since Codes Cleared	OBD2 STAT	On Board Diagnostics 2 System Type

Tool	Description	Tool	Description
CLR TRIPS	Number of Warm-ups Since DTCs Cleared	OUT TEMP	Outside Air Temperature
CMD EQ RAT	Commanded Equivalence Ratio	PTO STATUS	Power Take Off Status
COOLANT	Engine Coolant	REL FRP	Relative Fuel Rail Pressure or Vacuum
EGR CMD	Commanded Exhaust Gas Recirculation	REL TPS	Relative Or Learned Throttle Position
EGR ERR	Exhaust Gas Recirculation Error	SECOND AIR	Secondary Air Pump Status
ENG RUN	Engine Run Time	ST FTRM	Short Term Fuel Trim
ENG SPEED	Engine Speed	ST FTRM x	Short Term Fuel Trim Bank x
EQ RATIO	Oxygen Sensor Equivalence Ratio	ST SEC FTx	Short Term Secondary O2 Sensor Fuel Trim Bank x
EVAP PURGE	Evaporative Emission System Vapor Purge Solenoid	THR POS x	Throttle Position x
EVAP REQ	Commanded Evaporative Emission System Purge	THROT CMD	Throttle Actuator Commanded
EVAP VP	Evaporative Emission System Vapor Pressure	TRIPS SNC CLR	Warmups Since Erase Codes
FUEL LEVEL	Fuel Level	TROUB CODE	DTC That Set Freeze Data
FUEL PRES	Fuel System Pressure	VEH SPEED	Vehicle Speed
FUEL SYS x	Fuel System x Loop Status	VPWR	Vehicle Power

A

A

Appendix B – Glossary

A/C:
Air Conditioner

A/D:
Analog to Digital

A/F:
Air/Fuel ratio. The proportion of air and fuel delivered to the cylinder for combustion. For example, an A/F ratio of 14:1 denotes 14 times as much air as fuel in the mixture. Ideally the A/F ratio is 14.7:1.

ABS:
Anti-lock Brake System

A/C Clutch Relay:
The PCM uses this relay to energize the A/C clutch, turning the A/C compressor on or off.

A/C Pressure Sensor:
Measures air conditioning refrigerant pressure and sends a voltage signal to the PCM.

A/C Pressure Switch:
A mechanical switch connected to the A/C refrigerant line. The switch is activated (sending a signal to the PCM) when the A/C refrigerant pressure becomes too low or high.

Actuator:
Actuators such as relays, solenoids, and motors allow the PCM to control the operation of vehicle systems.

Air Injection Reaction (AIR) System:
An emission control system operated by the PCM. During cold starts, an air pump injects outside air into the exhaust manifold to help burn hot exhaust gases. This reduces pollution and speeds warm-up of oxygen sensors and catalytic converters. After the engine is warm, the air will either be dumped back to the atmosphere (or into the air cleaner assembly) or sent to the catalytic converter.

APP:
Acceleration Pedal Position (Sensor)

ASR:
Acceleration Slip Regulation

Bank x:
The standard way of referring to the bank of cylinders containing cylinder #x. In-line engines have only one bank of cylinders. Most commonly used to identify the location of oxygen sensors. See **O2S**, **Sensor x**, **Sensor x**.

BARO:
Barometric Pressure Sensor. See **MAP Sensor**.

BBV:
Brake Boost Vacuum (Sensor)

BCM:
Body Control Module

Boost Control Solenoid:
A solenoid that is energized by the PCM, in order to control turbo/supercharger boost pressure.

Brake Switch Signal:
An input signal to the PCM indicating that the brake pedal is being pressed. This signal is typically used to disengage Cruise Control systems and Torque Converter Clutch (TCC) solenoids. See also **TCC**.

CAM:
Camshaft Position Sensor. Sends a frequency signal to the PCM in order to synchronize fuel injector and spark plug firing.

Catalytic Converter:
Designed to reduce exhaust emissions.

CAN:
Controller Area Network

CARB:
California Air Resources Board. Governing body for emissions control in California.

CKP REF:
Crankshaft Position Reference.

CKP:
Crankshaft Position. See **CPS**.

CKT:
Circuit

Closed Loop (CL):
A feedback system that uses the O2 Sensor(s) to monitor the results of combustion. Based on the signal(s) from the O2 sensor(s), the PCM modifies the air/fuel mixture to maintain optimum performance with lowest emissions. In closed loop mode, the PCM can fine tune control of a system to achieve an exact result.

CMP:
Camshaft Position Sensor

CO:
Carbon Monoxide; odorless gas produced by incomplete combustion.

Code Scanner:
A device that interfaces with and communicates information via a data link.

Continuous Memory Codes:
See **Pending Codes**.

B

CPS:
Crankshaft Position Sensor. Sends a frequency signal to the PCM. It is used to reference fuel injector operation and synchronize spark plug firing on distributorless ignition systems (DIS).

CTS:
Coolant Temperature Sensor. A resistance sensor that sends a voltage signal to the PCM indicating the temperature of the coolant. This signal tells the PCM whether the engine is cold or warm.

CVRTD:
Continuous Variable Real Time Damping

D/R:
Drive/Reverse

Data Link Connector (DLC):
Connector providing access and/or control of the vehicle information, operating conditions, and diagnostic information. Vehicles with OBD II use a 16-pin connector located in the passenger compartment.

Data Stream:
The actual data communications sent from the vehicle's PCM to the data connector.

DEPS:
Digital Engine Position Sensor.

Detonation:
See **Knock**.

DI/DIS:
Direct Ignition/Distributorless Ignition System. A system that produces the ignition spark without the use of a distributor.

DPFE:
Differential Pressure Feedback – Exhaust Gas Recirculation Sensor

DTC:
Diagnostic Trouble Code. An alphanumeric identifier for a fault condition identified by the On Board Diagnostic System.

Duty Cycle:
A term applied to signals that switch between on and off. Duty cycle is the percentage of time the signal is on. For example, if the signal is on only one fourth of the time, then the duty cycle is 25%. The PCM uses duty cycle type signals to maintain precise control of an actuator.

EBCM:
Electronic Brake Control Module

EBTCM:
Electronic Brake/Traction Control Module

ECM
Engine Control Module *or* Electronic Control Module

ECT:
Engine Coolant Temperature sensor. See **CTS**.

EEPROM:
Electrically Erasable Programmable Read Only Memory

EFE:
Early Fuel Evaporation

EFI:
Electronic Fuel Injection. Any system where a computer controls fuel delivery to the engine by using fuel injectors.

EGR:
Exhaust Gas Recirculation. The PCM uses the EGR system to recirculate exhaust gases back into the intake manifold to reduce emissions. EGR is used only during warm engine cruise conditions.

EOP:
Engine Oil Pressure (Switch)

EOT
Engine Oil Temperature (Sensor)

EPA:
Environmental Protection Agency.

ESC:
Electronic Spark Control. An ignition system function that warns the PCM when knock is detected. The PCM then retards spark timing to eliminate the knocking condition.

EST:
Electronic Spark Timing. An ignition system that allows the PCM to control spark advance timing. The PCM determines optimum spark timing from sensor information — engine speed, throttle position, coolant temperature, engine load, vehicle speed, Park/Neutral switch position, and knock sensor condition.

EVAP:
Evaporative Emissions System.

FC:
Fan Control

Freeze Frame:
A block of memory containing DTCs of the vehicle operating conditions for a specific time.

FTP:
Federal Test Procedure. Strict test of vehicle's emissions.

Ground (GND):
An electrical conductor used as a common return for an electric circuit(s) and with a relative zero potential (voltage).

Hall Effect Sensor:
Any of a type of sensor utilizing a permanent magnet and a transistorized Hall Effect switch. Hall Effect type sensors may be used to measure speed and position of the crankshaft or camshaft — for spark timing and fuel injector control.

HO2S:
Heated Oxygen Sensor. See **O2S**.

HVAC:
Heating, Ventilation & Air Conditioning (System)

I/M:
Inspection and Maintenance. An emission control program.

IAC:
Idle Air Control. A device mounted on the throttle body which adjusts the amount of air bypassing a closed throttle so that the PCM can control idle speed.

IAT:
Intake Air Temperature (Sensor)

ICM:
Ignition Control Module.

IMRC:
Intake Manifold Runner Control

IPC:
Instrument Panel Cluster

ISC:
Idle Speed Control. A small electric motor mounted on the throttle body and controlled by the PCM. The PCM can control idle speed by commanding the ISC to adjust its position.

ISO:
International Organization of Standardization also know as International Standards Organization.

KAM:
Keep Alive Memory

Knock Sensor (KS):
Used to detect engine detonation or knock. The sensor contains a piezoelectric element and is threaded into the engine block. Special construction makes the element sensitive only to engine vibrations associated with detonation.

Knock:
Uncontrolled ignition of the air/fuel mixture in the cylinder. Also referred to as detonation or ping. Knock indicates extreme cylinder pressures or “hotspots” which are causing the air/fuel mixture to detonate prematurely.

KOEO:
Key On Engine Off. Turn the ignition key to on, but don’t start the engine.

KOER:
Key On Engine Running. Start the vehicle.

LCD:
Liquid Crystal Display

LTFT:
Long Term Fuel Trim

M/T:
Manual transmission or manual transaxle.

MAF:
Mass Air Flow (sensor). Measures the amount and density of air entering the engine and sends a frequency or voltage signal to the PCM. The PCM uses this signal in its fuel delivery calculations.

MAP:
Manifold Absolute Pressure (sensor). Measures intake manifold vacuum or pressure and sends a frequency or voltage signal (depending on sensor type) to the PCM. This gives the PCM information on engine load for control of fuel delivery, spark advance, and EGR flow.

MAT:
Manifold Air Temperature (sensor). A resistance sensor in the intake manifold that sends a voltage signal to the PCM indicating the temperature of the incoming air. The PCM uses this signal for fuel delivery calculations.

MIL:
Malfunction Indicator Lamp. The MIL is most commonly known as the Check Engine or Service Engine Soon light. A required on-board indicator to alert the driver of an emission-related malfunction.

Misfire:
Caused by the air fuel ratio being incorrect.

Monitor:
A test performed by the on-board computer to verify proper operation of emission-related systems or components.

MPFI or MFI:
Multi-Port Fuel Injection. MPFI is a fuel injection system using one (or more) injector(s) for each cylinder. The injectors are mounted in the intake manifold, and fired in groups rather than individually.

NOx:
Oxides of Nitrogen. The system EGR and Camshafts injects exhaust gases into the intake manifold to reduce these gases at the tailpipe.

O2S:
Oxygen Sensor. Generates a voltage of 0.6 to 1.1 volts when the exhaust gas is rich (low oxygen content). The voltage changes to 0.4 volts or less when the exhaust gas is lean (high oxygen content). This sensor only operates after it reaches a temperature of approximately 349ºC (660ºF). O2 sensors are usually found both upstream and downstream of the catalytic converter. The PCM uses these sensors to fine tune the air-fuel ratio and to monitor the efficiency of the catalytic converter. See **Bank 1**, **Bank 2**, **Sensor 1**, **Sensor 2**.

OBD II:
On-Board Diagnostics, Second Generation. OBD II is a U.S. Government-mandated standard requiring all cars and light trucks to have a common data connector, connector location, communication protocol, DTCs and code definitions. OBD II first appeared on vehicles in late 1994, and is required to be present on all cars sold in the US after January 1, 1996.

ODM:
Output Device Monitor.

Open Loop (OL):
A control system mode that does not monitor the output to verify if the desired results were achieved. A fuel delivery system usually operates in open loop mode during cold engine warm-up because the oxygen sensors are not yet ready to send a signal. Without the oxygen sensor signal, the computer cannot check the actual results of combustion.

PCM:
Powertrain Control Module. The brains of the engine and transmission control systems housed in a metal box with a number of sensors and actuators connected via a wiring harness. Its job is to control fuel delivery, idle speed, spark advance timing, and emission systems. The PCM receives information from sensors, then energizes various actuators to control the engine. The PCM is also known as the ECM (Engine Control Module).

Pending Codes:
Also referred to as Continuous Memory codes and Maturing Diagnostic Trouble Codes. Pending Codes may be set by emission related powertrain components and systems. If the fault does not occur after a certain number of drive cycles, the code is erased from memory.

PID:
Parameter Identification. Identifies an address in memory which contains vehicle operating information.

PNP:
Park/Neutral Position. A switch that tells the PCM when the gear shift lever is in the Park or Neutral position. When in Park or Neutral, the PCM operates the engine in an idle mode.

PROM:
Programmable Read-Only Memory. The PROM contains programming information the PCM needs to operate a specific vehicle model/engine combination.

PSPS:
Power Steering Pressure Switch

Purge Solenoid:
Controls the flow of fuel vapors from the carbon canister to the intake manifold. The canister collects vapors evaporating from the fuel tank, preventing them from escaping to the atmosphere and causing pollution. During warm engine cruise conditions, the PCM energizes the Purge Solenoid so the trapped vapors are drawn into the engine and burned.

PWM:
Pulse Width Modulated

PZM:
Platform Zone Module

QDM:
Quad Driver Module

RAM:
Random Access Memory

Relay:
An electromechanical device in which connections in one circuit are switched.

Reluctance Sensor:
A type of sensor typically used to measure crankshaft or camshaft speed and/or position, driveshaft speed, and wheel speed.

ROM:
Read-Only Memory. Permanent programming information stored inside the PCM, containing the information the PCM needs to operate a specific vehicle model/engine combination.

RPM:
Revolutions Per Minute

SAE:
Society of Automotive Engineers.

Scan Tool:
A device that interfaces with and communicates information on a data link.

SDM:
Sensing and Diagnostic Module

Sensor x:
A standard term used to identify the location of oxygen sensors. Sensor 1 is located upstream of the catalytic converter. See **O2S**, **Bank 1**, **Bank 2**.

Sensor:
Any device that reports information to the PCM. The job of the sensor is to convert a parameter such as engine temperature into an electrical signal that the PCM can understand.

SFI or SEFI:
Sequential Fuel Injection or Sequential Electronic Fuel Injection. A fuel injection system that uses one or more injectors for each cylinder. The injectors are mounted in the intake manifold and are fired individually.

Solenoid:
A device consisting of an electrical coil which when energized, produces a magnetic field in a plunger, which is pulled to a central position. A solenoid may be used as an actuator in a valve or switch.

STFT:
Short Term Fuel Trim.

STS:
Service Throttle Soon

TAC:
Throttle Actuator Control

TBI:
Throttle Body Injection. A fuel injection system having one or more injectors mounted in a centrally located throttle body, as opposed to positioning the injectors close to an intake valve port. TBI is also called Central Fuel Injection (CFI) in some vehicles.

TCC:
Torque Converter Clutch

TCM:
Transmission Control Module

TCS:
Traction Control System for PCM and brakes

TDC:
Top Dead Center. When a piston is at its uppermost position in the cylinder.

TFP:
Transmission Fluid Pressure

TFT:
Transmission Fluid Temperature (Sensor)

Throttle Body:
A device which performs the same function as a carburetor in a fuel injection system. On a throttle body injection (TBI) system, the throttle body is both the air door and the location of the fuel injectors. On port fuel injection systems (PFI, MPFI, SFI, etc.), the throttle body is simply an air door. Fuel is not added until the injectors at each intake port are activated. In each case, the throttle body is attached to the accelerator pedal.

TPS:
Throttle Position Sensor. Potentiometer-type sensor connected to the throttle shaft. Its voltage signal output increases as the throttle is opened. The PCM uses this signal to control many systems such as idle speed, spark advance, fuel delivery, etc.

Traction Assist:

Assist in traction with brakes only.

Trip:

Vehicle operation for a period of time so the systems can be monitored.

TTS:
Transmission Temperature Sensor. A resistance sensor mounted in the transmission housing in contact with the transmission fluid. It sends a voltage signal to the PCM indicating the temperature of the transmission.

VECI:
Vehicle Emission Control Information. A decal located in the engine compartment containing information about the emission control systems found on the vehicle. The VECI is the authoritative source for determining whether a vehicle is OBD II compliant.

VIN:
Vehicle Identification Number. This is the factory-assigned vehicle serial number. This number is stamped on a number of locations throughout the vehicle, but the most prominent location is on top of the dashboard on the driver's side, visible from outside the car. The VIN includes information about the car, including where it was built, body and engine codes, options, and a sequential build number.

VSS:
Vehicle Speed Sensor. Sends a frequency signal to the PCM. The frequency increases as the vehicle moves faster to give the PCM vehicle speed information used to determine shift points, engine load, and cruise control functions.

VTD:
Vehicle Theft Deterrent

Warm-up Cycle:
Warm-up cycle is when the engine coolant temperature rises at least 40 degrees above that at engine start up.

WOT:
Wide-Open Throttle. The vehicle operating condition brought about when the throttle is completely (or nearly) open. The PCM typically delivers extra fuel to the engine and de-energizs the A/C compressor at this time for acceleration purposes. The PCM uses a switch or the TPS to identify the WOT condition.

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